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ABSTRACT

Several studies were conducted in 1987 by the Multilevel Evaluation Systems Project, which focuses on developing a model for a multi-purpose, multi-user evaluation system to facilitate educational decision making and evaluation. The project model emphasizes on-going integrated assessment of individuals, classes, and programs using a variety of indicators of educational quality and student outcomes. A prototype has been developed and refined through action research in collaboration with teachers, principals, and district decision makers in five school districts. In the process of developing a prototype microcomputer-based information system, the project studied issues related to the optimal content of information systems, the composition of quality indicators, useful reporting strategies for various levels, and the socio-organizational factors influencing the system's utility. During the first year of the project, through development and testing of the model, experience was gained in technical issues of implementation, including development of prototype computer software using the d-Base III-Plus package. Extensive documentation of prototype computer software for implementing the system is provided, and 11 figures are appended. (TJH)

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Center for Research
on Evaluation, Standards,
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Deliverable - November 1987

MULTILEVEL EVALUATION SYSTEMS PROJECT

"Final Report"

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MULTILEVEL EVALUATION SYSTEMS PROJECT

"Final Report"

Project Director: Joan Herman

Grant Number: OERI-G-86-0003

Center for the Study of Evaluation
Graduate School of Education
University of California, Los Angeles

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INTRODUCTION

This document presents the results of several sub-studies conducted during the last year by the Multilevel Evaluation Systems Project. The project has focused on the development of a model for a multipurpose, multi-user evaluation system designed to facilitate educational decisionmaking and to support school improvement and renewal.

The project model emphasizes on-going integrated assessment of individuals, classes and programs using a variety of indicators of educational quality and student outcomes. The model seeks to provide teachers and principals with useful information to analyze and improve the quality of their school and instructional programs while simultaneouly serving the accountability and decisionmaking needs of district administrators. A prototype has been developed and refined through action research in collaboration with teachers, principals, and district decisionmakers from participating school districts. In the process of developing a prototype, microcomputer-based information system, the project has been investigating issues related to the optimal content of information systems, the composition of quality indicators, useful reporting strategies for various levels, and the socio-organizational factors which influence the utility of the system.

The first paper which follows, "Evaluation for school improvement: Try-out of a comprehensive school-based model", presents an overview of the model and the results of its implementation in five school districts. This paper summarizes our findings with regard to the types of information which need to be included in a useful information system, the types of reports in which teachers and administrators express interest, the socio-organizational factors which affected implementation, and next steps for realizing a useful system. This paper has been submitted for journal review.

The second paper, "Structuring, managment and analysis of multi-level evaluation system data", focuses on technical issues in implementing the model system, emphasizing in particular the problems of assuring data quality and appropriate data use at the local level and their implication for future design. This paper was presented at the 1987 annual meeting of the American Educational Research Association, as part of a project organized symposium on the topic of improvement-oriented evaluation systems.

The third section of this report presents documentation of the current version of prototype software for

EVALUATION FOR SCHOOL IMPROVEMENT: TRY-OUT OF A COMPREHENSIVE SCHOOL-BASED MODEL

Overview

"How well are we doing?" "How can we make things better?" School boards, administrators and educators constantly ask such questions. They are, however, difficult to answer. While districts often collect a great deal of data as part of their routine evaluation activities, such data is often poorly suited to illuminate these basic issues. Collected in the names of sound management and rational decisionmaking, the data instead often sits unused on bookshelves, in thick computer printouts, and in inaccessible computer files, with little or no significant impact on the process of education in districts, schools, or classrooms.

CRESST's Multilevel Evaluation Systems project seeks a more useful approach to evaluation by developing and implementing Baker's "top-down, bottom-up" evaluation model (Baker, 1983). The model calls for context sensitive information for principals and teachers to help them improve their instructional programs and policy sensitive information for superintendents, board members, and other administrators to inform their program planning and evaluation. More specifically, the project has the following objectives:

1. To develop and implement a model multipurpose evaluation system designed to facilitate educational decisionmaking and to support school improvement and renewal;

2. To develop and implement a core data base, drawing on a broad variety of quality indicators, that can serve the diverse decisionmaking needs of teachers, administrators and district policymakers;

3. To develop and implement a data management system that will provide student level, class level, grade level, school district, and inter-district summaries across selected measures included in the data base;

4. To extend our understanding of the production and use of information and its impact on educational innovation.

The project model draws on accumulated knowledge about what makes school effective, about what makes evaluative information useful to teachers and administrators; about what makes an information system useful in organizations; and on the power of currently available, low cost

microcomputer technology. In the sections below, the rationale underlying the project model is summarized briefly followed by a description of its implementation in five school districts. We end by considering the implications of the pilot project for the future design of school-based information systems.

Background

The model is premised on the assumptions that evaluation can be a valuable tool for improving schools, and that the collection, analysis, and distribution of information can stimulate and inform action to upgrade the quality of education. It assumes that evaluation information can have such an affect by facilitating better educational decisionmaking, improved instructional planning and more effective school management at all levels of the educational hierarchy. District and school administrators, for example, can use valid information about student achievement, among other indicators, to make judgments about their schools' performance, to evaluate the effectiveness of particular programs, to establish grade, school, or district wide priorities, to allocate resources wisely, and to spot curricular or other problems needing correction. Using information about student test performance, attitudes, preferences, etc. in combination with their own perceptions, teachers might more easily and effectively accomplish critical tasks such as assigning students to groups, diagnosing individual learning problems, monitoring student progress, assessing subject matter mastery, identifying students who need remediation or enrichment activities. Teachers and the principal working together could use information about school context, instructional processes and outcomes to analyze local problems and improve the effectiveness of their school programs. School board members and district leaders could likewise use such information to get a comprehensive, accurate picture of the quality of their schools and to target their improvement efforts accordingly.

But while evaluation information has this potential power, its impact has been quite modest (Alkin et al., 1979; Cohen & Garet, 1975; Patton, 1986). Why the discrepancy? The reasons appear to be many and varied. The source and nature of formal evaluation practice over the last two decades appears to be a major limiting factor. Much of this practive has led to the proliferation of standardized tests devoted to supplying the needs of legislators and administrators at the federal, state and local levels who wished to know how mandated programs were working and how schools were achieving. The people at the bottom -- teachers and local administrators -- have been seen as data providers rather than data users, as implementers of reform efforts rather that initiators of such efforts.

Teachers and local school administrators meanwhile have questioned the validity of these "top-down" evaluation efforts, arguing that required tests do not reflect what they are teaching and that some are inappropriate for particular groups of students (Herman & Dorr-Bremme, 1983). They claim further that the paperwork and bureaucratic burdens associated with mandated evaluation requirements intruded into, rather than supported, their own planning and improvement efforts. They have argued also that improvement of educational quality must be directed at local school sites where teachers and administrators directly interact with children. "Bottom-up" needs, in short, are not being well served by mandated evaluation and testing programs.

Complementing these concerns were criticisms by some in the research community who also have questioned the value of standardized tests (Baker, 1983; Eisner, 1985; Sirotnik & Burstein, 1984). Criticized as providing a very limited view of educational quality, these tests, for the most part, examine student performance on only a narrow slice of the curriculum, emphasizing basic skills and giving little attention to learning in the content areas, higher-order reasoning skills, and the multiplicity of other academic, social, and vocational goals which schools are supposed to address.

Using "test scores only" to capture educational quality suffers from other validity problems as well. While the "How well are we doing" question provides impetus for much evaluation activity, answers framed solely in terms of test scores sometimes mask as much as they clarify. Contrary to what may be the belief of many policy makers, it is not possible to backward chain from a single test score to inferences about the overall quality of education in a state or district or at a particular school. Student test scores are the result of many factors, school quality among them. Cultural, social, economic, demographic and motivation factors also are clearly influential, but often ignored in giving districts or schools report cards. Inequities and invalidities result, crediting schools which serve advantaged populations and disadvantaging schools serving minority and poor students.

But even if credible testing instruments were available, more broadly-based tests administered, and the results integrated within a social/economic/community context, a serious deficiency in many previous evaluation conceptualizations would remain. Evaluation in support of school improvement at the local level should not be limited to the type of data typically collected: outcome data. Left undocumented by evaluations focusing only on outcomes are the processes and context features which create or contribute to those outcomes. Understanding these is

critical to directing an effective agenda for school improvement. Eisner speaks to this point:

> "If we want to understand why we get what we get from our schools we need to pay attention not simply to the scores, but to the ways in which the game is played."

School context and process, thus, have not been used sufficiently as a source of explanatory hypotheses in routine evaluation practice (Sirotnik, 1984). They also have been neglected but as important intervening factors which influence how evaluation data themselves are interpreted and how they are used for school improvement and change (Sirotnik et al., 1985; Dorr-Bremme, 1984). Having technically sound, comprehensive data available does not assure that anyone will look at them, analyze them, discuss them, or take action stimulated by them. A growing literature on factors which influence evaluation utilization (Alkin et al., 1979, 1985; Bank & Williams, 1985), on factors which contribute to change and innovation in schools (Berman & McLaughlin, 1977; Sarason, 1982; Heckman et al., 1983) and on factors that affect the implementation of evaluation and information systems in fields outside of education (Lucas, 1975; Markus, 1981; Multinovich & Vlahovich, 1984) provides clues on knowledge utilization -- factors such as leadership support, ownership, perceived relevance, fit with routine practice, incentives, etc. which can be expected to influence whether evaluation information is acted upon and used to alter existing practices.

There are many reasons, in short, why evaluation has had only peripheral influence on teachers, principals and district personnel in their efforts to improve schools. To summarize: evaluation has been primarily linked with "top-down", "highly centralized improvement approaches which have not been sensitive to "bottom- up" needs; evaluation data has been based primarily on a narrow range of outcomes; evaluation often has ignored critical variables in the context and process of schooling; evaluations have not sufficiently considered the factors which would facilitate attention to findings and translation of findings into action.

Recognizing these limitations, some school districts are currently developing innovative evaluation systems that serve multiple users and their diverse information needs (Bank & Williams, 1984, 1985; Idstein, 1985; Dussault, 1985). Radical changes in evaluation methodology are emerging reflecting both the reality of our decentralized or "loosely coupled" educational system and the awesome power of computers.

Education comes down to what happens to students in classrooms and schools. Educational quality comes down to critical interactions between teachers and their students, behind the classroom door. Further, more so than in the past, schools and classrooms today encompass tremendous diversity in student population, in teacher skills, in curricular goals, in teaching strategies. Because of this diversity and because of the locus of instructional control, the school building, rather than more remote and larger administrative units, is the appropriate unit for solving many educational problems (Goodlad, 1983; Baker, 1983). Consequently, school personnel are among the appropriate designers and beneficiaries of improvement-oriented evaluation systems.

Individual schools however, often do not have sufficient resources, expertise, control, etc. to solve all their educational problems by themselves. Solutions frequently require initiative, direction, resources, and/or actions at higher administrative levels, levels which have legal responsibilities for governance, personnel, resource allocation, and policy formation, among other things. These realities suggest the desirability of a system of evaluation which could provide local schools with a rich, locally sensitive information base to aid their problem-solving and which could also provide appropriate aggregate information for decisionmaking at higher levels of the system. One potentially promising approach is a distributed information system which gives actors at various levels immediate access to a shared core of data but enables them to supplement and analyze it in response to their specific decision needs. The relatively low cost availability of powerful microcomputer technology makes possible a number of intriguing options for local site processing, data networking and a variety of lateral and horizontal linkages.

An Improved Model

The limitations in current practice, the reality of the loosely coupled (Weick, 1978) educational system, and the availability of new technology all support the need for a new, top-down - bottom-up model of evaluation, one which provides quality data to aid the decisionmaking of policymakers and local school practitioners and one which provides a productive tool for improving the quality of schools. The background discussion and the problems it articulates foreshadow a number of features deemed critical for a such a valid and useful evaluation system:

1. it makes relevant information easily available to teachers, school administrators, and district and state policymakers to aid their decisionmaking;

2. it includes information on a range of school outcomes;

3. it includes information on school context and student characteristics to contextualize outcome and effectiveness analyses;

4. it includes information on school and instructional processes to elucidate and analyze local problems and accomplishment;

5. it links outcome information with instructional process and school context data to provide explanatory power for findings;

6. it enables efficient sharing of information within and across levels of the educational hierarchy, minimizing redundant, overlapping testing and evaluation requirements;

7. it includes externally fixed elements to assure sensitivity to information needs at the district and state levels and variable, locally selected elements and measures of interest to school professionals;

8. it encourages data collection, analysis, and use over time;

9. it builds on organizational and management strategies to facilitate system use including such things as:

-locating responsibility for defining the system dually at the school and district levels

-facilitating ownership and flexibility for local school uses

-assuring leadership support at the district and school levels

-attending to specific information and reporting needs to all groups

-making the system user-friendly and easily accessible.

Attending to these critical features, the project model utilizes a comprehensive information base about student characteristics, school context, school and instructional process and a range of outcomes that can be analyzed, arrayed, and appropriately reported at various levels to facilitate decisionmaking at the classroom, school, district, and perhaps state levels and to satisfy

reporting requirements for special programs. (Figure 1 displays an overview of the model system.) The multilevel character of the system enables essentially the same set of data to be analyzed from the decision perspectives of a variety of users -- district policymakers looking at the performance and quality of the district as a whole, principals and teachers assessing effectiveness at the school level; teachers examining class-level outcomes and individual student strengths and weakness. While providing a common core data base available to all users, the model also reserves a place for interests and concerns unique to each unit. The information base at each level, in short, is comprised of fixed data elements (i.e., common for all sites) and variable elements (at the discretion of individual schools, etc.). Critical to the model is that its constituent data elements are collaboratively defined by intended user groups and its implementation managed to encourage ownership and promote use; further, to facilitate information use where education actually occurs, the system is school-based.

The next section describes a field test of this model in collaboration with five school districts in the Eastern United States.

Technical Approach

An important element in the technical approach was the organizational structure through which the project was to operate. The five participating school districts were a part of the University of Pennsylvania's School Council. The project was initiated at the request of the district superintendents and became a designated project of the Council. The Council's executive director served as project director responsible for facilitating and coordinating planning and implementation. Steering committees were constituted within each district to assure local representation and input into project planning and to locate responsibility for implementation within each district. Each steering committee included teacher, principal, and district administrator representatives as well as the district superintendent; superintendents were encouraged to designate one member as project coordinator for their district. The Center for Study of Evaluation at the University of California, Los Angeles was responsible for the original project conceptualization and for providing technical assistance in identifying data, instrumentation and analysis needs and for providing student, classroom, school, and district level data reports. The initial plan was to include two schools from each of the participating districts and two fourth and fifth grade classrooms at each participating school.

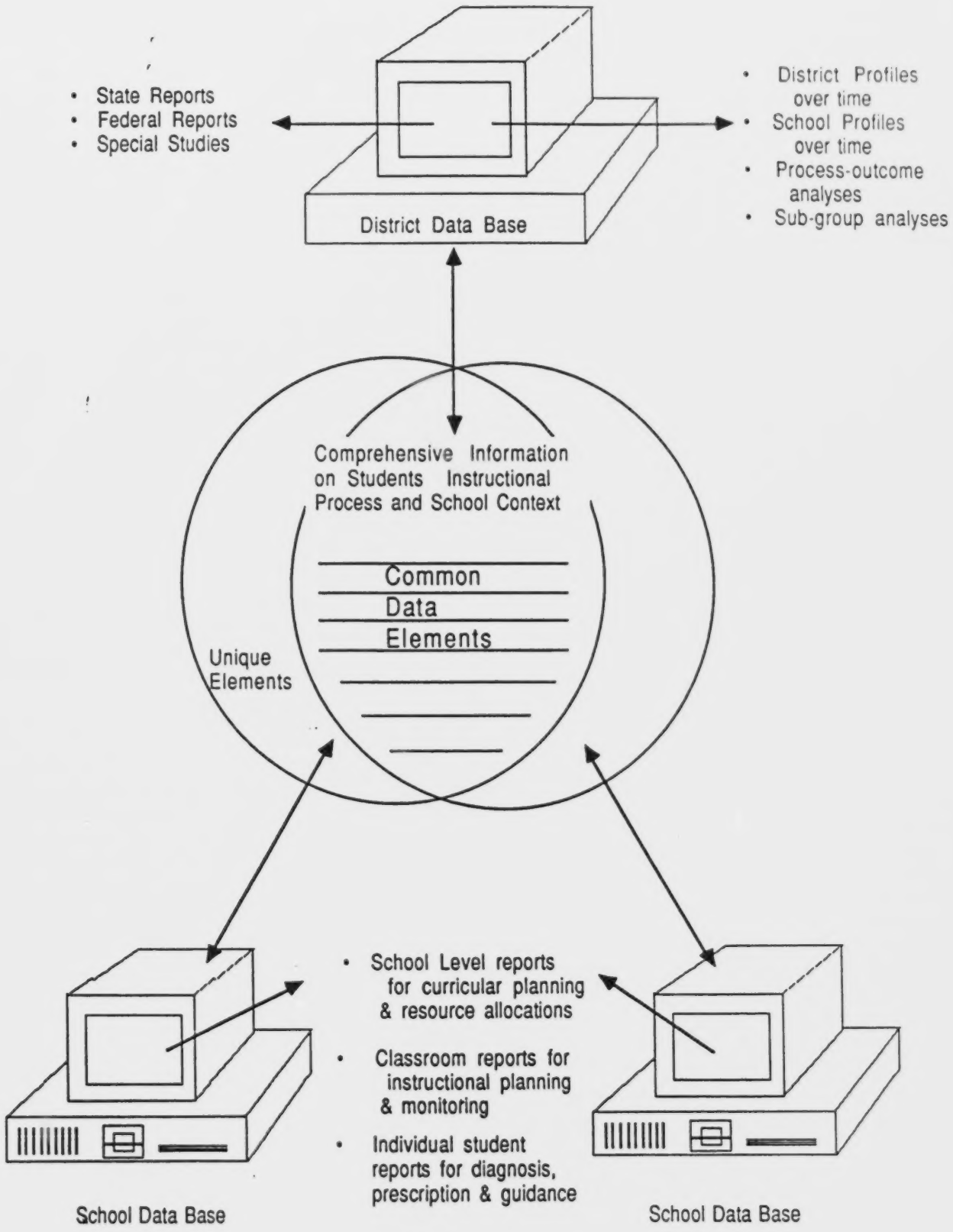
• State Reports
• Federal Reports
• Special Studies
District Data Base
• District Profiles over time
• School Profiles over time
• Process-outcome analyses
• Sub-group analyses
Comprehensive Information on Students Instructional Process and School Context
Common Data Elements
Unique Elements
• School Level reports for curricular planning & resource allocations
• Classroom reports for instructional planning & monitoring
• Individual student reports for diagnosis, prescription & guidance
School Data Base
School Data Base

Figure 1

The technical approach proceeded in four general steps:

1. Deciding what needs the evaluation system should serve and the data that should be included within the core data base.

2. Determining data collection procedures.

3. Collection of data.

4. Determining data analysis and reporting needs.

Decisions in each of these areas were to guide the development and implementation of a user-friendly, microcomputer-based data management system to provide useful reports to teachers, principals, district administrators, superintendents and board members. (To enhance initial reporting flexibility and to avoid potentially costly reprogramming efforts, initial analysis were done on UCLA's mainframe computer.)

Essentially parallel processes were used to accomplish each of the above steps. Working meetings including participants from all five districts were convened to consider each decision area, to determine common priorities from among a range of given options, and to review progress and proposed products. Follow-up meetings in each individual district were used to verify consensus, to identify unique concerns and unique data requirements for each school/district, and to review instrumentation and reports. Data collection proceeded in two fourth grade and two fifth grade classrooms in each participating school; data collection included a combination of rostering archival data and administering specially developed student and teacher questionaires. The results section below describes how the model was operationalized in the five districts, including the questions the information system was designed to elucidate, the types of indicators considered relevant, and the types of analyses and reports deemed useful.

Results

<u>What needs and concerns should the evaluation system meet?</u> While there was considerable diversity in the types of concerns expressed, several common questions emerged across the working groups. Their questions concerned the outcomes of schooling for students, the nature and effectiveness of the educational process, and the influence of the context in which instruction occurs. More specifically, their questions included:

Student Outcomes

- How much growth do students show over time?
- How does student performance compare to that of similar students in other districts?

Process

- Are resources effectively allocated and used?
- What instructional practices contribute to quality education?
- Are educational programs challenging and appropriate in their levels of expectation for students?

Context

- Can school climate contribute to quality student performance?
- What's the role of student background in their performance?

Concerns unique to each district focused on academic performance in specific subject matter areas, the effectiveness of particular instructional practices, the special needs of students from particular backgrounds, and the influence of contextual features specific to the district.

What indicators might help illuminate these questions? Starting with an initial pool of potential indicators identified on the basis of the literature, a core list of priorities was identified for student outcomes, instructional process, school context, and student demographic characteristics. Highly ranked elements across all five districts were student outcomes as indicated by standardized achievement test scores (reading, math, language) as well as affective outcomes such as attitudes toward school and academic self-concept. A broad range of student characteristics were viewed as important, including identification information such as sex, ethnic background, years at current school, and program designation (e.g., Chapter I, Special Education, Gifted). Highly ranked instructional practices included primary learning goals and objectives, instructional time, and expectations for achievement and class conduct. Important contextual features included quality of worklife (for teachers, school staff, and administrators), school climate, and parent involvement. In addition, each district designated specific

elements within each category as important based on their unique situation, improvement priorities, and concerns.

Following screening for measurement feasibility and political consequences, consensus was reached that the following data elements would comprise the core database system:

Backround Information About Students
Age
Grade level
Sex
Ethnic backround
Time at current school
Time in district
Attendance/absence rate
Socio-economic status
Language status
Special program participation

Information on Student Outcomes
Reading achievement
Math achievement
Attitude toward reading, including liking, perceived importance, self-confidence
Attitude toward Math, including liking, perceived importance, self-confidence
Attitude toward school, including motivation, academic self concept, sense of control, instructional mastery

Classroom Processes
Use of instructional time
Expectations of achievement
Amount of homework
Use of individualized instruction
Use of instructional resources and materials
Student instructional preferences (materials and activities)

School Content
School climate:
- Perceptions of physical plant
- Perceptions of principal
- Perceptions of teachers
- Perceptions of other students

Parent participation
Frequency of parent help
Parent support for school
Parent knowledge about school

What kinds of analysis and reports are desired?
Presented with a variety of options, users appeared torn between simple visual displays which graphically highlighted

trends or group patterns on one or a few variables and their desire to see "everything at once" on a single page or on a single screen. Thus, although almost everyone in the group found graphics more appealing than numbers, they also wanted rosters that would enable them to see all scores at once. In general, as one might expect, district superintendents were more interested than teachers in looking at trends over time and were more sophisticated in their ability to analyze the data in depth and in their ability to understand more complex displays (e.g., analyses of score distributions over time). Teachers, in keeping with their responsibilities, were more satisfied with simple bar charts which enabled them to analyze their classes at single point in time. Both reporting formats and preferred types of analyses, in other words, differed for the various user groups. Based on initial preferences, the following reports by user group appeared to be desireable:

District Superintendents

Student achievement in reading and mathematics and their attitudes for the district as a whole and for each school, including longitudinal tracking of the same cohort over several years; and cross-sectional analysis of the same grade levels over time. They were interested in displays which would give them a sense of the mean as well as the score distribution, (e.g., box plots) and wanted to be able to examine the performance of all schools within their district on a single graph. They also wanted to be able to see and track over time the proportion of students in their district scoring in each national quartile;

Group comparisons (by grade) of student achievement in reading and mathematics by SES (high, medium, low), by sex, by ethnicity, by special program, by regularity of school attendance (absent less than 10 days, between 10 and 20 days, 20 or more days annually), and by years in current school (new vs. longer term resident students);

Overall school climate by school;

Scattergrams for any significant relationships found between any of the instructional or school context variables and student achievement and attitudes;

District profile and school profiles rostering all outcomes, school climate, and demographic variables.

School Principals

Student achievement in reading and in math over time by student; by class; by grade for their school; by special program participation for their school; and by student demographic characteristics;

Student attitudes by grade;

Selected instructional process and school context variables, including expectations for achievement, amount of parent support and amount of homework by student; by class, and by grade;

Relationships, if any, between time and achievement, parent participation and achievement, expectations and achievement and between attitudes and achievement.

Teachers

Roster of individual students to include all student background characteristics except SES; all outcomes; parent support/help with schoolwork; instructional preferences, and perceptions of the school climate;

Breakdowns of their class by grade level; ethnicity; attendance rates; special program status; each outcome; each instructional process and school context variable;

School by grade level breakdowns by ethnicity; absence rates; language status; special program participation; sex.

Design Consideration

The above preferences provide a blueprint for analysis, without regard to the appropriateness, technical quality, or confidentiality of particular data sources. For example, teachers wanted individual responses about students' attitudes and school climate (including perceptions of the teacher). Yet it is questionable whether student attitude measures are sufficiently reliable at the individual level to warrant that level of diagnosis and attention; it is likewise moot whether students will answer honestly about their perceptions of the teacher if they know that their teacher will have direct and easy access to their responses. Similar questions arise with regard to teachers' or principals' responses to sensitive school issues. (This, in fact, was the reason why "quality of work life" was deleted from the original set of system elements.)

The reporting priorities articulated above also are generally mute about what constitutes appropriate and meaningful summary statistics for reporting various process and outcome indicators. These are partially technical decisions based on the nature of the assessment devices employed but user preferences are equally important if utility is to maximized -- i.e., what kinds of summaries are perceived as most familiar, easily understandable and/or meaningful? With norm-referenced assessments, for instance, a wide variety of derived scores are possible, e.g., percentile scores, NCE's Grade equivalents, stanines, quartiles; and each type of score can be characterized in a variety of ways: mean, median, percentage of students scoring above, below, and/or within a particular score range, e.g., mean percentile scores, percentage of students scoring above grade level, percentage of students scoring in the highest quartile compared to the national norm group. Further, what constitutes meaningful cut-off point for reporting score distributions will vary depending on the local context and priorities. For example, an inner city school might want to examine the percentage of students scoring at or above the national average as an indicator of effectiveness, while the cut-off point for a more advantaged suburban environment might be quite different.

The choice of meaningful cut-off scores, in other words, is an interpretation issue that needs to be resolved during analysis. Regardless of whether the measures are more criterion-referenced or nationally normed, the nature of the local distribution and human judgment will need to be taken into account. In our study, many of the student questionnaire items, including the attitudes toward reading and mathematics scales, used Likert type scales that generally represents the range from very negative to very positive. How should mean scores from such measures be interpreted? What represents a positive response, a negative response, a neutral response, particularly given the nature of self-report measures? Is there a cut-off point above which or below which scores deserve special scrutiny? Similarly with the interpretation of attendance data. What is satisfactory attendance? What level indicates a potentially significant problem?

The interest across all groups in an "everything at once on a single page" roster that might provide an overall picture of quality and performance and at the same time enable users to detect potential trouble spots gives rise to additional scaling and interpretation concerns. How do users compare performance across various indicators, particularly when some are norm-referenced, some are criterion-referenced, and others reflect different scales? An intuitive solution was used to solve the problem. To counteract evaluation's negative image, the reports were

designed to emphasize the positive; we chose group summary indicators that would be constituted as "percent responding positively." What counted as "responding positively" was defined by the measure as interpreted by local users: for norm-referenced achievement measures, it meant scoring at least one-half year above grade level; for the norm-referenced attitude measure, it meant scoring at or above the 70 percentile; for point scale. Additional work needs to be conducted to arrive at more elegant, technically grounded solutions, but the point to emphasize is that users wanted and needed some kind of common scale against which they could interpret all the data.

Usage considerations. As users examined the reports, a number of observations were apparent. (Figures 2-11 in the appendix display some sample reports.) First and foremost, teachers and principals generally were uncomfortable in dealing with numbers and needed considerable support in understanding them. This was not necessarily a problem with the reports themselves but rather speaks to the extensive orientation/training that educators may need prior to or accompanying system use. What do the different scores and statistics mean? How should they be interpreted? What's a productive strategy for delving into the data? Further, this apparent anxiety about numbers and dealing with data meant that displays need to be labelled as clearly and as completely as possible and short-hand titles or abbreviations avoided. To help guide naive users' inquiries, it may also be helpful to frame displays in terms of the question(s) that the data can help answer.

The technical naivete of the potential users brings with it also the problem of guarding against the misuse/misinterpretation of the data. For example, in one district report, students' test score performance was compared by ethnic group. In several cases, there was only a couple of students representing a particular group and any conclusions would be unfounded and erroneous. Rather than assuming that users will know when particular analyses are inappropriate, it may be better to program the system to suppress analyses under given conditions. This parallels the suggestion made earlier regarding suppressing access to data that may violate privacy or standards of technical quality for particular levels of use. A similar issue relates to data access. Who shall have access to what data? Are there political or other reasons to restrict access to particular data elements or particular levels of analysis? What safeguards need to be provided and how?

Another observation relates to the continuing tension between individualized reporting options and ease of report access. It was clear with the "at a glance" rosters, for example, that different users representing the same role group wanted different data elements included on the form

(it is not possible to include everything on a single page or screen); as another example, there were many individual differences in preferred graphic displays and tolerance for numbers of elements displayed. A reasonable compromise may be to provide standard reporting options for easy access, but enable more dedicated or more computer-comfortable users an option to design their own analysis forms.

Finally, it appears that the types of reports desired by the different levels of users may need to vary not only in the level of analysis but in the sophistication of the display. Superintendents continued to be interested in stem and leaf plots and other displays which gave them a sense of the score distributions while teachers were desirous of more simplified pictures. To avoid endless arrays of menu selections, it may be more effective to branch the program by user group and customize the reports to each groups' needs; reports may also need to be customized for each individual district. In any event, additional interactive work is needed with each user group to be more sensitive to their preferences, interests and concerns.

Summary and Conclusions

The field test of a prototype multilevel evaluation model in five school districts produced a number of important lessons for future project design. First and foremost, teachers, principals, district administrators, and school board members were interested in getting better information about the quality of their schools and interested in a broad array of information to aid their decisionmaking. They were enthusiastic about both broadening available data beyond standardized tests and being involved in the decision process. There also was substantial agreement across the various groups on the types of indicators and data that would be most beneficial.

However, data-based decision making is a new concept for most teachers and principals, and although familiar to district administrators and policymakers, they have little experience with its many possible iterations. The amount of support intended users need in envisioning a comprehensive system and how its data might be used to help them to accomplish their responsibilities should not be underestimated. For example, users needed far more orientation to the model concept, to the potential role of data in teaching, school and district decisionmaking and policy needed, and to specific, concrete examples of use prior to trying to articulate their own information needs or subsequent analysis and reporting needs.

Further, and related to the first point, because a data-based information system represented a new idea and an innovation in the ways schools and the personnel within them

typically operate, its implementation required sustained attention to the organizational and socio-political factors which facilitate change. The process of implementation was designed to promote user ownership in the system by trying to build the system around user needs and getting their input and reactions at each step; further we tried to foster district ownership and responsibility for the project by establishing steering committees within each district and requesting that one person be designated as coordinator for within-district operations. In addition, because the superintendents were enthusiastic about the project and their districts' participation in it, and because principals volunteered their schools for the project, we assumed that critical leadership support would be forthcoming as would sustained interest and attention to the project. We assumed that each district could be relatively self-sustaining and manage its own process without extensive intervention or support from the project coordinator. These assumptions, unfortunately, turned out to be partially erroneous. Bringing teachers, principals and other administrators in for several central planning meetings was not sufficient to build their ownership; considerably more interaction was required. Although steering committees were implemented and responsibilities assigned, the locus of the project apparently was perceived by some districts as outside their district -- potentially a function of the fact that participants had difficulty envisioning exactly what the final product was going to look like or what it was going to do for them, or how it fit within their work routines. In addition, crises emerged in some districts which eclipsed the salience and importance of the project and the attention it was accorded by school leadership. Time delays in the project further eroded support. The bottom line was that project activities were perhaps viewed as more peripheral than central to participants, and their project commitment and memory needed further bolstering. Future implementation will need to pay greater attention to the organizational structures and incentives supporting the project and to facilitating group process both within and across projects.

Quality control also emerged as an important problem area. Project participants in the main are unschooled in the technical requirements for rigorous data collection and coding; as a result, things which we as researchers take as self-evident (and provided directions for), e.g., the need to carefully designate student ID numbers and/or teacher ID numbers and/or school ID numbers on all completed instruments, did not receive the care we had naively anticipated. Early and repeated checks for data quality, in short, need to be built into the system. At a minimum, districts needed more precise and prescriptive directions for handling data and assignment of ID numbers; in our directions, we tried to be responsive to individual differences in district practices by providing flexible

guidelines. Our good intentions, however, ended up doing the districts a disservice; more prescriptive rules would have been easier to follow. In addition, any data entry process should routinely check for out of range values and for consistency and accuracy of ID numbers.

Fourth, while data about school and instructional process are critical in a sound evaluation system, the feasibility of collecting data that is sensitive to intended uses bears further scrutiny. It is moot whether easily collected self-report data are sufficiently precise to support school and class level planning or process-outcome analyses. However, while more indepth observational approaches are possible, their time, resource and commitment requirements raise difficult cost-benefit questions.

Finally, we are left with an overall strategy question about the optimal approach to system development and implementation. The project reported here attempted a "top-down, bottom-up" approach to the development process, merging our own top-down vision of what the project might look like and accomplish with the bottom-up needs of the various users groups. Neither set of requirements were initially fully specified and this caused tensions and impediments throughout the development process. Rather than combining the two approaches, it perhaps would have been better to begin with one or the other: e.g., start with a fully flushed out version of an information system and the sets of questions and problems it could address, and then modify/adjust the system to accommodate bottom-up needs; that is, start top-down with an imposed order, but then let local users adapt to their context. Another approach would be to start bottom-up with explorations of the problems and decisions that particular user groups are faced with and work interactively with them to discover the ways in which data can help them and the reports and displays that are of greatest use. Which of these is the more effective approach is an empirical question worthy of future study.

REFERENCES

Alkin, M., Daillak, R., & White, P. (1979). Using evaluations: Does evaluation make a difference? Beverly Hills, CA: Sage Publications.

Alkin, M., Jacobson, P., Burry, J., Ruskus, J., White, P., & Kent, L. (1985). A guide for evaluation decision makers. Beverly Hills, CA: Sage Publications.

Baker, E.L. (1983). Evaluating educational quality: A rational design. Invited address, Educational Policy and Management, University of Oregon.

Bank, A., & Williams, R.C. (1984). The search for consequences: Assessing the impact of district instructional information systems. Evaluation and Program Planning, 6 (3).

Bank, A., & Williams, R.C. (1985). From program evaluation to instructional information systems. Studies in Educational Evaluation, 11 (2).

Berman, P., & McLaughlin, M.W. (1977). Federal programs supporting educational change Vol III: Implementing and sustaining innovations. R-1589/8-HEW, Santa Monica, CA: Rand Corporation.

Cohen, D.K., & Garet, M. (1975). Reforming educational policy with applied social research. Harvard Educational Review, 45(1), 17-43.

Dorr-Bremme, D. (1984). Contextual influences in developing a school-based comprehensive information system. In L. Burstein, & K. Sirotnik, Comprehensive information systems for local school improvement: A reality-test in secondary schools. Report to NIE. Los Angeles: UCLA Center for the Study of Evaluation.

Dussault, N.F. (1985). Integrating instructional information systems into the instructional process. Presented at the invitational conference "Information Systems and School Improvement: Inventing the Future," UCLA Center for the Study of Evaluation, Los Angeles.

Eisner, E. (1985). The art of educational evaluation: A personal view. Philadelphia, PA: The Falmer Press

Goodlad, J.I. (1983). A place called school. New York: McGraw Hill.

Heckman, P.E., Oakes, J., & Sirotnik, K.A. (1983). Expanding the concepts of renewal and change. Educational Leadership, 40, pp.26-32.

Herman, J., & Dorr-Bremme, D. (1983). Uses of testing in the schools: A national profile. New directions for testing and measurement, No. 19. San Francisco: Jossey-Bass, pp. 7-17.

Idstein, P. (1985). Let's create the future but let's keep it a secret. Presented at the invitational conference "Information Systems and School Improvement: Inventing the Future," UCLA Center for the Study of Evaluation, Los Angeles.

Lucas, H.C. (1975). Why information systems fail. New York: Columbia University Press.

Markus, M.L. (1981). Systems, Objectives, Solutions. Implementation politics: Top management support and user involvement. Amsterdam: North Holland Publishing Co.

Multinovich, J.S., & Vlahovich, V. (1984). A strategy for a successful MIS/DDS implementation. Journal of Systems Management, 35, pp. 8-15.

Patton, M.Q. (1986). Utilization-focused evaluation. Second Edition. Beverly Hills, CA: Sage Publications.

Sarason, S.B. (1982). The culture of the school and the problem of change. Second Edition. Boston: Allyn & Bacon.

Sirotnik, K.A. (1984). An outcome-free conception of schooling: Implications for school-based inquiry and information systems. Educational Evaluation and Policy Analysis, 6(3), 226-239.

Sirotnik, K.A., & Burstein, L. (1984). Making sense out of comprehensive school-based information systems. Los Angeles: UCLA Center for the Study of Evaluation.

Sirotnik, K.A., Dorr-Bremme, D., & Burstein, L. (1985). Social vs clinical perspectives in the use of information: Implications for school-based information systems. Systemic Evaluation Project Deliverable to NIE. Los Angeles: UCLA Center for the Study of Evaluation.

Weick, K.E. (1978). Educational organizations as loosely coupled systems. Administrative Science Quarterly, 21, pp. 1-19.

Structuring, Management and Analysis of Mutli-Level Evaluation System Data

by Anna Long

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Structuring, Management and Analysis of Multi-Level Evaluation System Data

Introduction

The Multi-Level Evaluation System project has provided an excellent opportunity to explore many of the complexities of the management and analysis of data arising from diverse sources for a school-based system intended for multiple level uses. The overall goal of the project was the development and implementation of a top-down, bottom-up evaluation model which would provide both context sensitive and more general level information for use by teachers, administrators, and district policymakers. Specific project objectives were as follows:

1. To develop and implement a school-based multipurpose evaluation system designed to facilitate educational decisionmaking and support school improvement and renewal;

2. To develop and implement a core data base that can serve the diverse decisionmaking needs of teachers, administrators and local policymakers, drawing upon a variety of quality indicators and sources of information to support the school improvement process;

3. To develop and implement a micro-computer-based data management system that will provide student level, class level, grade level, school district, and inter-district summaries across selected measures in the data base;

4. To extend our understanding of the production and use of this knowledge and its impact on educational innovation.

A prototype development project was conducted in collaboration with five school districts. The districts agreed upon and collected a common core of data for their systems. The resulting project data base contained a variety of demographic, achievement, perception and attitudinal information on 892 students representing two grade levels (4th and 5th) at eight

schools.

This paper focuses on the issues and implications emerging from the pilot related to data collection, management and analysis of a micro-computer-based multi-level evaluation systems. Specific topics discussed include: (1) computer system considerations; (2) requirements for data collection, structuring and management; (3) implications for data analysis; and (4) specific recommendations for the implementation of similar projects.

Computer System Considerations

While a school-based micro-computer driven system was envisioned as a final product, UCLA's mainframe computer was used for the prototype. The rationale behind this choice was threefold: (1) to increase the flexibilty and speed with which data could be cleaned and structured into a complex data base; (2) to minimize initial programming efforts by taking advantage of readily available canned data management, statistical analysis and reporting programs; (3) to maintain flexibility in report production procedures prior to finalizing the format of desired district, school, and classroom reports.

In addition, centralizing our data base development efforts by compiling one huge data set containing information from all five school districts was intended to result in significant efficiencies. Ideally, each district would provide the information in exactly the same manner and the resulting data base would be consistent across districts. Consequently we anticipated that data cleaning, management and analysis could

proceed for all districts simultaneously.

All data management and analysis for this stage of the project was carried out at the UCLA Office of Academic Computing (OAC) facility. The OAC maintains an IBM 3090-200 mainframe computer and a variety of peripheral hardware (tape drives, exstensive direct link terminals, disk packs and printers). The OAC system had several tape drives and the necessary software which was capable of reading and writing numerous combinations of tape specifications. Complete with a real memomry capacity of 128 megabytes (compared to the standard 640 kilobytes of the standard AT type micro-computer), the mainframe was capable of analysing huge data sets with speed and efficiency. In addition, it was possible to download data created on the mainframe to forms acceptable for micro-computers. In general, the mainframe offered the needed flexibility the project required and allowed for the production of a data base which would serve as a reasonable prototype for future work in the micro-computer multi-level evaluation system.

Data Collection, Structuring and Management

A major project task involved the identification of the types of information to be collected for inclusion in the data base. Planning meetings were held with representatives from each end-user level group (district superintendents, school principals and classroom teachers) to identify the specific data to be collected. The desired information included data regarding student background and achievement outcomes, information on classroom process and school context (assessed at both the student and teacher levels) and specific student perceptions and

attitudinal data. Once the informational needs of these users had been identified, specific data collection activities commenced. A complete list of variable content is given in Table one.

One of the first challenges in the data management/ analysis phase of the project involved the compilation of raw data from several different sources. First, archival standardized achievement test data were obtained by each district and sent on to UCLA. Data for inclusion in the data base came in two forms, as either test publishing company tapes or hard copy data from school reports.

Second, students participating in the project were surveyed at their respective schools to obtain data on their perceptions and attitudes regarding classroom process, school climate and school related attitudes, perceptions and preferences. Participating classroom teachers also received questionnaires to obtain their perceptions of classroom process and school content. Student demographic data were obtained from district or school records.

To facilitate the process of data collection and processing, participating districts were provided with directions for rostering, coding and subsequent keypunching of demographic data. Specifications were also provided for the preparation of achievement test tapes. Student background data included age, sex, ethnicity, special federal and local program participation, school attendance and in many cases socio-economic data based on parents' occupation. Unfortunately these data elements tended to

Table One. Variable Content of Data Base

Student Demographic and Background Data

Age
Grade
Sex
Ethnic background
Time at current school
Time in current school district
Attendance/absence rate
Socio-economic status
Language status
Special program participation (federal and local programs)

Student Outcomes

Math achievement - includes conceptual, computational subscales to total scores
Reading achievement- includes2to 3reading subscales (depending on the test used) and total reading scores
Attitude toward reading - includes liking, perceived importance, and reading self-confidence
Attitude toward math - includes liking, perceived importance, and math self-confidence
Student Attitude Measure - includes the following subscales:

Motivation for schooling
Academic Self-Concept (performance based)
Academic Self-Concept (reference based)
Student's sense of control over performance
Student's instructional Mastery

Classroom Processes

Use of instructional time
Student expectations of achievement
Amount of homework
Preferences for use of individualized instruction
Preference for use of instructional resources and materials

School Context

School climate: perceptions of physical setting
perceptions of principal
perceptions of teachers
perceptions of student

Parent participation: frequency of parental assistance
parental support for school
parental knowledge concerning school

vary widely across the participating districts. For example, while one district maintained attendance data as a percent of days absent over total days in the school year, another district provided attendance data as the total number of days each student attended. Ethnicity was also specified differently by the various districts. Some districts maintained records with three or four categories (White, Black, Hispanic and Other) while other districts used a six category coding schema (White, Black, Hispanic, Asian, Native American and Other). Such differences seriously impeded planned efficiencies of scale in data processing: analysis of each district had to be performed individually.

Standardized achievement test data similarly hampered attempts at uniform processing. While standardized tests in reading and math were routinely administed in each district, the specific tests differed (the ITBS/Multi-level, ITBS/CogAt and the ITBS/PB achievement tests were used by one or more districts), and even within a single district, different subscales were administered at different grade levels, further complicating the comparisons necessary for data analysis.

Another difficulty in incorporating achievement test information involved the manner in which students had been identified for testing purposes. Identifying project students emerged as a real difficulty. Often tapes were sent directly from the testing services and typically contained data from all students in a particular grade, at either the school or district level, rather than only those classrooms participating in the

project. Isolating the data for the project was further complicated by differences in identification code specifications between the publishers' tapes and the project. For example, in one district achievement test tapes identified students by the first eight letters of their last name and the first six letters of their first name; project identification code numbers were absent. In another case, the identification code included on the test tape did not match those used in the district demographic data sets. Consequently, it was necessary to re-create the achievement test ID's by altering the input statements on data sets that contained students full name and district identification codes. Using these re-created ID's, it was possible to link student's achievement data with other information currently in the project data base.

Student perception and attitude data were collected at the school level and questionnaires were keypunched according to prior specifications. While the resulting data sets were consistent across all students regardless of the district and grade level, several student identification inconsistencies became apparent during the data cleaning process. The original ID configuration was to contain district, school, teacher and individual student identifiers. However, district achievement and student background data often identified individual schools by code numbers different from those assigned for the purpose of the project. Teacher identification numbers were often assigned at the school level rather than at the district level. Therefore, despite prior instructions to the contrary, it was not uncommon to have the same ID code assigned to more than one

teacher within a district. Further, some students had not placed their assigned ID number on their questionnaires. In these cases, it was necessary to return to the original questionnaires to locate student's name and match their responses to the data.

Most of these problems were eventually resolved by the careful construction of a master ID data set containing all the different identification codes from different data sources (demographic, achievement and questionnaire data), along with students' full names, teacher, grade, school and district. Using this master data set, it was possible to merge all the data into the final data base.

The resulting data base contained 892 students and 426 variables. This data base was limited by missing data elements at each level of data. For example, socio-economic information was not available for some students, and other students were absent during the adminstration of standardized achievement tests. However, despite missing information, the basic data base contained well coordinated, comprehensive data which would present several challenges for analysis.

Data Analysis

The results of planning meetings, as expected, indicated that district superintendents, board members, principals and teachers desired different levels of analysis and reports; all, however, were interested in summary tables which would enable them to see everything at a glance, and in graphical displays.

SAS (Statistical Analysis System) was used for all data management and analysis procedures. Becauses SAS graphics

options were more limited than we had originally anticipated, vertical percentage and horizontal mean bar graphs were selected for presentation of descriptive data. Further, the SAS CHART procedure was used to compare performance of different groups (grades, sex, etc.) on the same graph based on pre-specified grouping variables. We experimented with pie charts, box graphs and other forms of graphical presentation, but the multiple groups bar graphs proved the least confusing of all our options.

The SAS CHART procedure produced graphs which allowed for the inclusion of a variable name (8 characters) and a descriptive label (40 characters) on each graph. Levels of any grouping variable used in the graph could only be represented by an eight character label (e.g., "male", "female", etc.) and were presented on the resulting graph in alphabetical order. Even following careful creation of group labels, variable names and descriptive labels, several of the graphs produced by SAS still required additional labelling.

Summary tables containing means for continuous subscales (school climate, achievement outcomes) and percentage breakdowns for categorical data were constructed for more detailed descriptive data. One problem commonly incurred in analysis involved missing data elements. Demographic data often proved the least attainable, and groupings based on this information often contained only a few students and did not accurately represent the total data for a given classroom.

Relational analyses were limited to correlations. Correlations were performed on student outcome and classroom process and school context and the results were presented in

simple matrices. The final reports included demographic, student perception, attitude and outcome profiles. In addition, teachers wanted classroom rosters which would display outcome and attitude data on one page.

A serious implication of the reporting phase involved the potential misuse of information based on extremely small numbers of students (e.g. graphs illustrating the performance of groups stratified on demographic variables). In many cases, missing data resulted in only one or two students representing a given demographic group (ethnicity or SES). Conclusions based on apparent differences between groups containing small numbers of students would be erroneous since there is no way to determine the representiveness of these students.

Data Transfer

The final task following analysis and report production was the preparation of data for future use in a micro-computer environment. Several considerations were necessary prior to this transformation. First it was necessary to determine what system would be used for future work with the data base. One of the goals of the project was to compile a prototypical data base for use on an micro-computer based evaluation system. Consequently, the data would need to be transferred to a media ultimately compatible with micro systems. Since most micro-computers are not equipped to handle tapes, it was obvious that data would eventually need to be downloaded to floppy diskettes.

It is not uncommon to copy a mainframe SAS data set to tape for backup purposes; however, the transfer of these tapes between

mainframe facilities is generally not recommended due to problems with system incompatibility. Consequently, it would be necessary to download the data to a micro-computer system at UCLA and then send the diskettes to Pennsylvania. While the downloading of ASCII format data or text from mainframe to floppy diskettes is a relatively simple procedure, downloading SAS data sets was a new challenge. UCLA had recently installed the SAS R-LINK procedure which would transfer SAS data sets on the IBM mainframe down to SAS sets on a micro-computer.

The transfer process was a complex one requiring communications to be set up between the SAS programs on the micro and mainframe computers simultaneously. Using a modem to establish the communication link between the mainframe and the micro-computers, it was necessary to access the mainframe data set through an interactive support facility and then transfer the data directly to the micro-computer SAS program (SAS-PC) to floppy diskettes.

Because of the size of the data base, it was necessary to create smaller data sets containing all the information from one district. Only one of these district data sets was small enough to be contained on a single diskette. The remaining four district data sets required further partitioning. Three of the four remaining district data sets were partitioned by student into smaller sets. Each of these three district data sets was split into two smaller data sets containing all the variables, with 100 students in the first set and the remaining students in the second data set. The resulting two smaller data sets would only require appending (the adding of one set to another) to

reconstruct the original district data set.

The fifth district data set was so large that it had to be partitioned several times resulting in a total of ten separate data sets. Because of the large number of variables for this data set (complete demographic data; several achievement test item scores, subscale scores and total scores and other test equivalents; and all questionniare data) and the large number of stuents (424 students from two grades), our experience with this district data set was similar to what could be expected for implemetation of the data base at a school level.

The district data set was first partitioned by school resulting in two separate data sets, one for each school containing 272 and 152 students respectively. Each of these two school data sets was then partitioned further by variable into two data sets. At this point each of the two schools had two data sets, one containing achievement data, the other containing student background and questionnaire data.

Finally, each of these four data sets (two per school) was partitioned based on the number of students. In the case of the larger school, each of the two data sets was divided into three data sets containing 100, 100 and 72 observations (resulting in a total of six data sets). The smaller school's two data sets were each divided into two data sets containing 100 and 52 observations (a total of four data sets).

An IBM AT was used for downloading. First, the micro-computer version of SAS is a large program requiring a hard disk for storage and a math coprocessor as well. Second, the AT was

equipped with a more powerful processor thereby increasing its processing speed. The AT was equipped with a high densisty 1.2 megabyte disk drive. While PC's and XT's are equipped with the standard 360 Kbyte floppy drives, the 1.2 megabyte drive writes over three times the amount of data on a floppy diskette. However, we decided to use the standard 360K drive to allow for data use on a variety of micro's (PC, XT, or AT). The total data base required 17 diskettes.

Another difficulty was the time required to download the data. The smallest data set, 98 observations, took over twenty minutes to download. Because we were using a modem, any disturbance in the communication line resulted in a program crash and the download process would have to be re-initiated.

The implications of this discussion for the implementation of a school-based micro-computer evaluation system are several. Most important is the need for early consideration of the use of the data. Will it be necessary to transfer the data to a district level system? If so, what variables are needed (individual achievement test items scores versus a subscale total score)? Decisions in this area will automatically impact the size of the data set. Will teachers use the data base, and if so would smaller classroom data sets be desirable?

Ultimately data stored on a hard disk system for current use will need to be downloaded for storage as the school year ends. Certain data, such as demographic information would remain intact while other data such as attendance and special program participation might be downloaded to floppy diskettes for storage. Other data, such as achievement test subscale scores

would be maintained for year-to-year tracking of student progress. The collapsing of the current data base and downloading of older data will require technical expertise which may not be available at the school level. In these cases, care should be taken in choosing software which will be particularly user friendly with respect to data management and data base manipulation.

Discussion

This paper has provided a brief overview of some of the complexities which presented themselves throughout the prototype development phase of the project. Because the project incorporated data from five school districts, this process was particularly complicated, and as indicated above, anticipated economies of scale failed to be realized. Based on this experience, we have identified some measures which should facilitate the smooth implementation of project such as this in the future.

First and foremost considerations include hardware and software specifications. Developing a single micro-computer based evaluation system which can accomodate multiple settings and levels of analyses is a complex undertaking requiring custom designed, user friendly software. Hardware and software considerations should be closely coordinated with the identification of information needs phase of the project. The individuals who will be compiling and analyzing the data base should be consulted early in the planning phase of the project. Among our recomendations are the following:

1. Avoid overestimating the technical expertise and sensitivity of the planned system users. A school-based system with rapid turnaround requirements will probably require that data collection, input and analysis be handled at the school level. Technical expertise in these areas may be limited.

2. As a corollary to the above, be sure to build in ample safeguards to assure the integrity of the data; providing directions is insufficient. It will be necessary to incorporate data verification procedures into input routines to check for out of range values, non-existant identification codes, and other data input errors. Automated entry options may also help sustain data quality. For example, if instrumentation utilizes scantron technology, one serious source of error, resulting in time consuming data cleaning procedures, may be reduced. In any event, the need to carefully monitor data entry and to build in reliability and accuracy checks during the input process is well demonstrated in our experience.

3. The technical expertise (or lack thereof) of local users also suggests the need for safeguards against potential misuse of data and drawing conclusions that are not warranted by available data, (e.g., drawing conclusions related to ethnicity or socio-economic status based on very small numbers of students).

4. Also related to both use of the data and potential levels of technical expertise, users will require a great deal of support in reading and interpreting the resulting reports. Issues such as headings, clarity of variable and instrument labels are more important than often anticipated. The graphics capability of the software used to develop the multilevel system is therefore an important selection factor.

5. Processing time required for analysis and report production tend to be underestimated. Even at the school level, it is likely that data sets will be relatively large in both numbers of students and specific variables. A school-based system will generally require powerful microprocessors, as well as a great deal of patience. If SAS-PC, BMDP, SPSS or other similar micro-computer statistical analysis systems are used, special mathco-processors may be required to allow for more than very basic types of analyses. In any case, the generation of instant reports, given available school resources, probably will not be a short-term reality.

6. The development of a generic software system in the face of differences in instrumentation (e.g., standardized tests), identification coding strategies, and variable definition is an ambitious goal. Experience has demonstrated that each school or district may require either customized adaptation or an entirely new system specially designed to fit their needs. We found that our anticipated economies of scale were unrealistic and that each site required a more individualized approach.

While we experienced a number of problems, we remain

optimistic that the careful examination of these considerations, the early involvement of those who will construct the data base and those who will ultimately use it on a regular basis, and the careful coordination and monitoring of data collection will facilitate the process of development and implementation of useful multi-level evaluation systems.

DOCUMENTATION OF PROTOTYPE SOFTWARE FOR IMPLEMENTING THE SYSTEM

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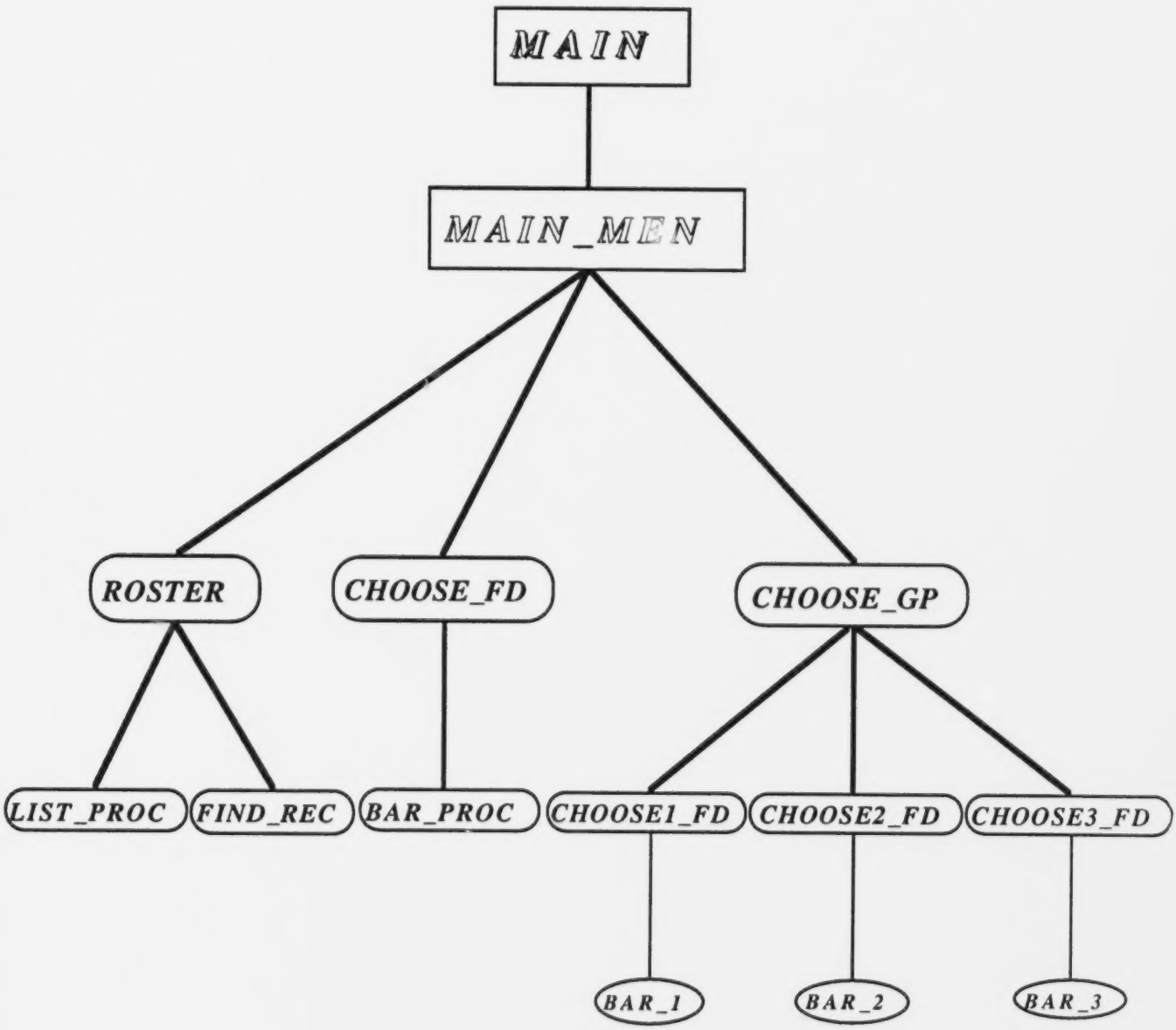
PROGRAM STRUCTURE



```
*****************************************************************
**
**      Program: main
**
**      Use: sets up files used for Penn data base
**
**      Programmer:  Richard G. Feifer    Sen Qi
**
*****************************************************************


public this_yr last_yr
public dbg
dbg = .t.
select 1                                    &&  OPEN MAIN DATABASES AND ASSIGN
use students alias studs                    &&  EACH TO A WORK AREA
set index to students, studs_num

select 2
use att_subj alias subj
set index to att_subj

select 3
use att_sch alias sch
set index to att_sch

select 4
use achievem alias ach
set index to achievem

*  COMPUTE THE VARIABLE THIS_YR, THE DATE OF THE LAST TEST
this_yr = iif(month(date())<7, year(date())-1902, year(date())-1901)
last_yr = this_yr -1

do main_men     &&  RUN MENU TO CHOOSE TYPE OF REPORT

return
```

```
* Program..: MAIN_MEN.PRG
* Author...: SEN QI     RICHARD G. FEIFER
* Date.....: 12/22/86
* Notice...: Copyright (c) 1986, All Rights Reserved
* Notes....:
* Reserved.: selectnum
*

SET TALK OFF
SET BELL OFF
SET STATUS ON
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 13,79 DOUBLE
   @ 3,19 SAY [C H O O S E   T Y P E   O F   R E P O R T :]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,29 SAY [1. STUDENT AT A GLANCE]
   @  8,29 SAY [2. TEST SCORES OVER TIME]
   @  9,29 SAY [3. COMPARISON AMONG GROUPS]
   @ 11, 29 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 13,33 SAY " select     "
   @ 13,42 GET selectnum PICTURE "9" RANGE 0,3
   READ

   DO CASE
      CASE selectnum = 0
         SET BELL ON
         SET TALK ON
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO Student at a glance
         do roster
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO Test scores over time
         do choose_fd.prg
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET wait_subst
         READ
```

```
            SET CONFIRM ON

         CASE selectnum = 3
         *  DO Comparison among groups
            do choose_gp.prg
            SET CONFIRM OFF
            STORE ' ' TO wait_subst
            @ 23,0 SAY 'Press any key to continue...' GET wait_subst
            READ
            SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: MAIN_MEN.PRG
```

```
*****************************************************************
**
**      Program: Roster
**
**      Use:  Prints "Students at a Glance"
**
**      Programmer:  Richard G. Feifer      Sen Qi
**
*****************************************************************

set echo off
set talk off
set procedure to list_proc
clear
store 'N' to lis
@ 12,2 say "Teacher?  (want a list?)" get lis
read
if upper(lis) = 'Y'
   clear
   do get_list
   wait
endif
clear
accept 'Which teacher? ' to mteacher
select studs
set filter to teacher = mteacher
go top
accept 'Hard copy? ' to mhc
mhc = upper(left(mhc,1))
hard = iif(mhc ='Y',.t.,.f.)
if hard
  set print on
  set device to printer
endif
clear
? 'STUDENTS AT A GLANCE'
? 'Teacher:  ', mteacher  , '          ', date()

?
?
? '                              G S       R   R    M   M    A    P    P'
? '                              R P       E   D    A   T    M    R    R'
? '                              A P   A   A   V    T   V    T    H    S '
? 'Student   Student             D R   B   D   A    H   A    H    L    U'
? 'Number    Name                E G   S   %   L    %   L    W    P    P'
? '_____________________________________________________________________'
line_num = 0

* Loop for each student
do while .not. eof()
  line_num = line_num + 1                    && Increment line number
  ? stud_num , ' '
  mname =left(trim(Lname)+', '+fname,15)     && Set variable for name
  ?? mname
  ?? space(17-len(mname))                    && Space over to 17th column
```

```
    ?? grade

    * Print special programs
    msp = iif(sp1,'G','')
    msp = iif(sp2,msp+'T',msp)
    msp = iif(sp3,msp+'I',msp)
    msp = iif(len(msp) < 1,'.',msp)
    ?? ' '+msp
    ?? space(4-len(trim(msp)))

    * Print Data
    ?? att_abs_rt
    ?? '  '
    select ach
    ach_found = .f.
    do find_rec with ach_found
    ?? iif (ach_found,str(mtper,2),' *')
    ?? '  '
    select subj
    subj_found = .f.
    do find_rec with subj_found
    ?? iif(subj_found,str(r_overall,3,1),'  *')
    ?? '  '
    ?? iif(ach_found,str(ach->rtper,2),' *')
    ?? '  '
    ?? iif(subj_found,str(m_overall,3,1),'  *')
    ?? '  '
    ?? iif(subj_found,str(amt_hw,3,1),'  *')
    ?? '  '
    ?? iif(subj_found,str(frq_parhlp,3,1),'  *')
    ?? '  '
    ?? iif(subj_found,str(pr_sup,3,1),'  *')
    select studs
    if line_num / 5 = int(line_num/5)
      ?                                    && Skip a line if after
    endif                                  && the 5th name
    skip
  enddo                 && End of main loop

  if hard
    eject
    set print off
    set device to screen
  set filter to
  return
```

```
*********************************************************
**
**      Program:  List_proc
**
**      Use:      Print List of Teachers
**
**      Programer:  Sen Qi
**
*********************************************************



procedure get_list
select 1
set index to teacher
list off teacher
set index to students, studs_num
return
```

```
*****************************************************************
**
**      Program: find rec
**
**      Use: Finds the record for the current student for
**           the current year
**
**      Programmer:  Richard G. Feifer
**
*****************************************************************
parameters found
go top
seek studs->stud_num
do while .not. eof() .and. stud_num = studs->stud_num .and. .not. found
  if year = this_yr
    found = .t.
  else
    skip
  endif
enddo
```

```
* Program..: CHOOSE_FD.PRG
* Author...: RICHARD G. FEIFER
* Date.....: 09/25/86
* Notice...: Copyright (c) 1986, RICHARD G. FEIFER, All Rights Reserved
* Notes....:
* Reserved.: selectnum
*
*  MENU WHICH ALLOWS THE USE TO CHOOSE WHICH FIELD IS DESIRED
*  FOR REPORT


SET TALK OFF
SET BELL OFF
SET STATUS ON
* SET ESCAPE OFF
SET CONFIRM ON
set procedure to bar_proc

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 18,79 DOUBLE
   @ 3,18 SAY [C H O O S E   F I E L D   T O   C O M P A R E]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,34 SAY [1. Reading 1]
   @  8,34 SAY [2. Reading 2]
   @  9,34 SAY [3. Reading 3]
   @ 10,34 SAY [4. Reading Total]
   @ 11,34 SAY [5. Math 1]
   @ 12,34 SAY [6. Math 2]
   @ 13,34 SAY [7. Math 3]
   @ 14,34 SAY [8. Math Total]
   @ 16, 34 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 18,33 SAY " select     "
   @ 18,42 GET selectnum PICTURE "9" RANGE 0,8
   READ

   DO CASE
      CASE selectnum = 0
         SET BELL ON
         SET TALK ON
         RETURN

      CASE selectnum = 1
      *  DO Reading 1
         mfield = 'r1'
         do bar_chart with mfield
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET wait_subst
```

```
   READ
   SET CONFIRM ON

CASE selectnum = 2
*  DO Reading 2
   mfield = 'r2'
   do bar_chart with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 3
*  DO Reading 3
   mfield = 'r3'
   do bar_chart with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 4
*  DO Reading Total
   mfield = 'rt'
   do bar_chart with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 5
*  DO Math 1
   mfield = 'm1'
   do bar_chart with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 6
*  DO Math 2
   mfield = 'm2'
   do bar_chart with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 7
*  DO Math 3
```

```
            mfield = 'm3'
            do bar_chart with mfield
            SET CONFIRM OFF
            STORE ' ' TO wait_subst
            @ 23,0 SAY 'Press any key to continue...' GET wait_subst
            READ
            SET CONFIRM ON

         CASE selectnum = 8
         *  DO Math Total
            mfield = 'mt'
            do bar_chart with mfield
            SET CONFIRM OFF
            STORE ' ' TO wait_subst
            @ 23,0 SAY 'Press any key to continue...' GET wait_subst
            READ
            SET CONFIRM ON
ENDCASE

ENDDO T
if dbg
  ? 'leaving choose_f.prg'
endif
RETURN
* EOF: CHOOSE_FD.PRG
```

```
*****************************************************************
**
**      Program:  Bar graph program
**
**      Use:  Generate a bar graph for supplied field
**            comparing 2 years.
**
**      Programmer:  Richard G. Feifer    Sen Qi
**
*****************************************************************


*****************************************************************
*       MAIN BAR PROCEDURE
*       CALLS SUBROUTINES
procedure bar_chart
   parameters mfield
set escape on
do case                          && DETERMINE THE TITLE AND MAXIMUM
  case mfield = 'r1'             && FOR RAW SCORES
     mname = 'Reading Score 1 '
     max = 20                        &&  THE KEY FOR NOW DOES NOT DIFFERENTIATE
     key = 'per20a'                  &&  GRADE.  ACTUAL VERSION WILL HAVE TO SET
  case mfield = 'r2'                 &&  THE KEY ONCE GRADE AND TEST ARE CHOSEN.
     mname = 'Reading Score 2 '
     max = 20
     key = 'per20b'
  case mfield = 'r3'
     mname = 'Reading Score 3 '
     max = 45
     key = 'per45'
  case mfield = 'rt'
     mname = 'Total Reading Score '
     max = 85
     key = 'per85'
  case mfield = 'm1'
     mname = 'Math Score 1 '
     max = 30
     key = 'per30'
  case mfield = 'm2'
     mname = 'Math Score 2 '
     max = 15
     key = 'per15'
  case mfield = 'm3'
     mname = 'Math Score 3 '
     max = 72
     key = 'per72'
  case mfield = 'mt'
     mname = 'Total Math Score  '
     max = 117
     key = 'per117'
  otherwise
     mname = 'Selected Field'
endcase
```

```
* SET DEFAULT VALUES FOR VARIABLES
mrfield = mfield+'raw'
mpfield = mfield+'per'
this_yr = iif(month(date())<7, year(date())-1902, year(date())-1901)
last_yr = this_yr -1
mrtotal1 = 0.00
mrtotal2 = 0.00
n1 =0
n2 = 0
mrave1 = 0.00
mrave2 = 0.00
mptotal1 = 0.00
mptotal2 = 0.00
mpave1 = 0.00
mpave2 = 0.00
store 'N' to ans
store 'N' to lis     &&  ASK USER FOR REPORT PARAMETERS
store 'ALL       ' to mteacher
store '   ' to mgrade
@ 10,2 say "Hard Copy?" get ans
@ 12,2 say "Teacher?  (want a list?)" get lis
read
if upper(lis) ='Y'
   clear
   do get_list
endif
@ 13,2 say "Teacher?" get mteacher
@ 14,2 say "Grade?  " get mgrade
read
mteacher = trim(mteacher)
if mteacher = 'ALL'
  chk_tch = .f.
else
  chk_tch = .t.
endif
if upper(ans) ='Y'
  hard = .t.
else
  hard = .f.
endif
do get_data
if hard
  set print on
endif


* PRINT REPORT
do p_head
do print_raw
do p_bars with 'Raw Scores', mrave1, mrave2, max
do p_bars with 'Percentiles', mpave1, mpave2, 100
if hard
  eject
  set print off
endif
```

```
return


*********************************************************
*  SHOW THE LIST OF THEACHERS AND GRADES
Procedure get_list
select 1
set index to teacher
list off teacher, grade
set index to students, studs_num
return

*********************************************************
*  PRINT BAR CHART HEADING
Procedure p_head
clear
?
?
? '                    Comparison of Test Scores'
? '                                '
?? iif(chk_tch,'Teacher: '+mteacher,'District Wide')
? '                                '+str(last_yr,2)+' - '+str(this_yr,2)
?
? '                              Grade: '+ mgrade
? '                            '+mname
?
?
?
return  && Print Heading


*********************************************************
*          COLLECT AND TOTAL THE DATA
Procedure get_data
select studs
set index to studs_num                      &&  SET RELATIONS SO THAT
select subj                                 &&  STUDENT INFORMATION IS
set relation to stud_num into studs         &&  AVAILABLE FOR WHATEVER
select ach                                  &&  RECORD IS BEING LOOKED AT
set relation to stud_num into studs
select sch                                      '
set relation to stud_num into studs
select ach
go top
the_grade = val(mgrade)
do while .not. eof()                        &&  STEP THROUGH THE RECORDS
 if .not. chk_tch .or. studs->teacher = mteacher .and. studs->grade = the_g
    do case
       case year = this_yr
            n1 = iif (&mrfield>0,n1+1,n1)
            mrtotal1 = mrtotal1 + &mrfield
       case year = last_yr
            n2 = iif (&mrfield >0,n2+1,n2)
            mrtotal2 = mrtotal2 + &mrfield
    endcase
```

```
  endif
  skip
enddo
clear
mrave1 = mrtotal1/n1
mrave2 = mrtotal2/n2
do findper with mpave1,mrave1
do findper with mpave2,mrave2
select studs
set index to students
return     && from get_data


*****************************************************************
*   LOOKS UP THE PERCENTILE SCORE FOR A GIVEN RAW SCORE
Procedure findper
  parameters mperc, mraw
select 6
use &key index &key
seek int(mraw)
mperc = per
USE              &&  CLOSE THE KEY FILE
return


*****************************************************************
*   PRINT A BAR OF THE APPROPRIATE LENGTH
Procedure stars
  parameters yr,num, max
  yrstr = str(yr,2)
  num = int(num)
? yrstr+'    ¦'
right = num * (70/max)           &&  COMPUTE THE NUMBER OF SPACES
  mcount = 1                     &&  NEEDED TO REPRESENT NUM
  do while mcount <= right
    ?? '#'                       &&  PRINT APPROPRIATE NUMBER OF SPACES
    mcount = mcount +1
  enddo
? '      ¦'
  mcount = 1
  do while mcount <= right
    ?? '#'
    mcount = mcount + 1
  enddo
return


*****************************************************************
*  PRINT BOTTOM OF BAR CHART
procedure bottom
  parameters max
? '      0'
interval = 1
do while interval < 4
  ?? space (14)
```

```
  ?? str(interval * (max/4),4,1)
  interval = interval + 1
enddo
  ?? space (14)
  ?? str(interval * (max/4),3)
return



*************************************
*  PRINT INDIVIDUAL BAR CHART
procedure p_bars
  parameters title, first, second, max
?
?
? '                    '+title
? '       ¦'
? '       ¦'
do stars with last_yr, first, max
? '       ¦'
? '       ¦'
do stars with this_yr, second, max
? '       ¦'
? '       ¦'
? '       +----------------+----------------+----------------+-----------
do bottom with max
return

************************************************************
*  PRINT DATA IN TEXT FORM ON A BAR REPORT
Procedure print_raw
? 'Total number of students with data for 19'+str(this_yr,2)+': '+str(n1,3)
? 'Average Raw score: '+str(mrave1,5,2)
? 'Average Percentile score: '+str(mpave1,5,2)
?
? 'Total number of students with data for 19'+str(last_yr,2)+': '+str(n2,3)
? 'Average Raw score: '+str(mrave2,5,2)
? 'Average Percentile score: '+str(mpave2,5,2)
?
return
```

```
* Program..: CHOOSE_GP.PRG
* Author...: QI SEN
* Date.....: 01/12/87
* Notice...: Copyright (c) 1987, QI SEN, All Rights Reserved
* Notes....:
* Reserved.: selectnum
*

SET TALK OFF
SET BELL OFF
SET STATUS ON
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 13,79 DOUBLE
   @ 3,16 SAY [C H O O S E   T Y P E   O F   C O M P A R I S O N]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,28 SAY [1. AMONG ETHNIC GROUPS]
   @  8,28 SAY [2. AMONG SPECIAL PROGRAMS]
   @  9,28 SAY [3. BETWEEN SEXES]
   @ 11, 28 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 13,33 SAY " select     "
   @ 13,42 GET selectnum PICTURE "9" RANGE 0,3
   READ

   DO CASE
      CASE selectnum = 0
         SET BELL ON
         SET TALK ON
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO AMONG ETHNIC GROUPS
         DO CHOOSE1_FD.PRG
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO AMONG SPECIAL PROGRAMS
         DO CHOOSE2_FD.PRG
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET wait_subst
```

```
            READ
            SET CONFIRM ON

         CASE selectnum = 3
         *  DO BETWEEN SEXES
            DO CHOOSE3_FD.PRG
            SET CONFIRM OFF
            STORE ' ' TO wait_subst
            @ 23,0 SAY 'Press any key to continue...' GET wait_subst
            READ
            SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: CHOOSE_GP.PRG
```

```
* Program..: CHOOSE1_FD.PRG
* Author...: QI SEN
* Date.....: 12/22/86
* Notice...: Copyright (c) 1986, QI SEN, All Rights Reserved
* Notes....:
* Reserved.: selectnum
*
*  MENU WHICH ALLOWS THE USE TO CHOOSE WHICH FIELD IS DESIRED
*  FOR REPORT


SET TALK OFF
SET BELL OFF
SET STATUS ON
* SET ESCAPE OFF
SET CONFIRM ON
set procedure to bar_1

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 18,79 DOUBLE
   @ 3,18 SAY [C H O O S E   F I E L D   T O   C O M P A R E]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,34 SAY [1. Reading 1]
   @  8,34 SAY [2. Reading 2]
   @  9,34 SAY [3. Reading 3]
   @ 10,34 SAY [4. Reading Total]
   @ 11,34 SAY [5. Math 1]
   @ 12,34 SAY [6. Math 2]
   @ 13,34 SAY [7. Math 3]
   @ 14,34 SAY [8. Math Total]
   @ 16, 34 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 18,33 SAY " select     "
   @ 18,42 GET selectnum PICTURE "9" RANGE 0,8
   READ

   DO CASE
      CASE selectnum = 0
         SET BELL ON
         SET TALK ON
         RETURN

      CASE selectnum = 1
      *  DO Reading 1
         mfield = 'r1'
         do graph with mfield
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET wait_subst
```

```
   READ
   SET CONFIRM ON

CASE selectnum = 2
*  DO Reading 2
   mfield = 'r2'
   do graph with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 3
*  DO Reading 3
   mfield = 'r3'
   do graph with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 4
*  DO Reading Total
   mfield = 'rt'
   do graph with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 5
*  DO Math 1
   mfield = 'm1'
   do graph with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 6
*  DO Math 2
   mfield = 'm2'
   do graph with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 7
*  DO Math 3
```

```
            mfield = 'm3'
            do graph with mfield
            SET CONFIRM OFF
            STORE ' ' TO wait_subst
            @ 23,0 SAY 'Press any key to continue...' GET wait_subst
            READ
            SET CONFIRM ON

         CASE selectnum = 8
         *  DO Math Total
            mfield = 'mt'
            do graph with mfield
            SET CONFIRM OFF
            STORE ' ' TO wait_subst
            @ 23,0 SAY 'Press any key to continue...' GET wait_subst
            READ
            SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: CHOOSE_FD.PRG
```

```
* Program..: CHOOSE2_FD.PRG
* Author...: QI SEN
* Date.....: 03/30/87
* Notice...: Copyright (c) 1987, QI SEN, All Rights Reserved
* Notes....:
* Reserved.: selectnum
*
*  MENU WHICH ALLOWS THE USE TO CHOOSE WHICH FIELD IS DESIRED
*  FOR REPORT


SET TALK OFF
SET BELL OFF
SET STATUS ON
* SET ESCAPE OFF
SET CONFIRM ON
set procedure to bar_2

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 18,79 DOUBLE
   @ 3,18 SAY [C H O O S E   F I E L D   T O   C O M P A R E]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,34 SAY [1. Reading 1]
   @  8,34 SAY [2. Reading 2]
   @  9,34 SAY [3. Reading 3]
   @ 10,34 SAY [4. Reading Total]
   @ 11,34 SAY [5. Math 1]
   @ 12,34 SAY [6. Math 2]
   @ 13,34 SAY [7. Math 3]
   @ 14,34 SAY [8. Math Total]
   @ 16, 34 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 18,33 SAY " select     "
   @ 18,42 GET selectnum PICTURE "9" RANGE 0,8
   READ

   DO CASE
      CASE selectnum = 0
         SET BELL ON
         SET TALK ON
         RETURN

      CASE selectnum = 1
      *  DO Reading 1
         mfield = 'r1'
         do graph with mfield
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET wait_subst
```

```
   READ
   SET CONFIRM ON

CASE selectnum = 2
*  DO Reading 2
   mfield = 'r2'
   do graph with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 3
*  DO Reading 3
   mfield = 'r3'
   do graph with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 4
*  DO Reading Total
   mfield = 'rt'
   do graph with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 5
*  DO Math 1
   mfield = 'm1'
   do graph with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 6
*  DO Math 2
   mfield = 'm2'
   do graph with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 7
*  DO Math 3
```

```
            mfield = 'm3'
            do graph with mfield
            SET CONFIRM OFF
            STORE ' ' TO wait_subst
            @ 23,0 SAY 'Press any key to continue...' GET wait_subst
            READ
            SET CONFIRM ON

         CASE selectnum = 8
         *  DO Math Total
            mfield = 'mt'
            do graph with mfield
            SET CONFIRM OFF
            STORE ' ' TO wait_subst
            @ 23,0 SAY 'Press any key to continue...' GET wait_subst
            READ
            SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: CHOOSE2_FD.PRG
```

```
* Program..: CHOOSE3_FD.PRG
* Author...: QI SEN
* Date.....: 01/26/87
* Notice...: Copyright (c) 1987, QI SEN, All Rights Reserved
* Notes....:
* Reserved.: selectnum
*
*  MENU WHICH ALLOWS THE USE TO CHOOSE WHICH FIELD IS DESIRED
*  FOR REPORT


SET TALK OFF
SET BELL OFF
SET STATUS ON
* SET ESCAPE OFF
SET CONFIRM ON
set procedure to bar_3

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 18,79 DOUBLE
   @ 3,18 SAY [C H O O S E   F I E L D   T O   C O M P A R E]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,34 SAY [1. Reading 1]
   @  8,34 SAY [2. Reading 2]
   @  9,34 SAY [3. Reading 3]
   @ 10,34 SAY [4. Reading Total]
   @ 11,34 SAY [5. Math 1]
   @ 12,34 SAY [6. Math 2]
   @ 13,34 SAY [7. Math 3]
   @ 14,34 SAY [8. Math Total]
   @ 16, 34 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 18,33 SAY " select     "
   @ 18,42 GET selectnum PICTURE "9" RANGE 0,8
   READ

   DO CASE
      CASE selectnum = 0
         SET BELL ON
         SET TALK ON
         RETURN

      CASE selectnum = 1
      *  DO Reading 1
         mfield = 'r1'
         do graph with mfield
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET wait_subst
```

```
   READ
   SET CONFIRM ON

CASE selectnum = 2
*  DO Reading 2
   mfield = 'r2'
   do graph with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 3
*  DO Reading 3
   mfield = 'r3'
   do graph with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 4
*  DO Reading Total
   mfield = 'rt'
   do graph with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 5
*  DO Math 1
   mfield = 'm1'
   do graph with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 6
*  DO Math 2
   mfield = 'm2'
   do graph with mfield
   SET CONFIRM OFF
   STORE ' ' TO wait_subst
   @ 23,0 SAY 'Press any key to continue...' GET wait_subst
   READ
   SET CONFIRM ON

CASE selectnum = 7
*  DO Math 3
```

```
            mfield = 'm3'
            do graph with mfield
            SET CONFIRM OFF
            STORE ' ' TO wait_subst
            @ 23,0 SAY 'Press any key to continue...' GET wait_subst
            READ
            SET CONFIRM ON

         CASE selectnum = 8
         *  DO Math Total
            mfield = 'mt'
            do graph with mfield
            SET CONFIRM OFF
            STORE ' ' TO wait_subst
            @ 23,0 SAY 'Press any key to continue...' GET wait_subst
            READ
            SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: CHOOSE3_FD.PRG
```

```
*****************************************************************
**
**      Program:  Bar graph program I
**
**      Use:  Generate a bar graph for supplied field
**            comparing among ethnic groups.
**
**      Programmer:  Qi Sen
**
*****************************************************************


*****************************************************************
*       MAIN BAR PROCEDURE
*       CALLS SUBROUTINES
procedure graph
   parameters mfield
set escape on

do case                          && DETERMINE THE TITLE AND MAXIMUM
  case mfield = 'r1'             && FOR RAW SCORES
     mname = 'Reading Score 1 '
     max = 20
  case mfield = 'r2'
     mname = 'Reading Score 2 '
     max = 20
  case mfield = 'r3'
     mname = 'Reading Score 3 '
     max = 45
  case mfield = 'rt'
     mname = 'Total Reading Score '
     max = 85
  case mfield = 'm1'
     mname = 'Math Score 1 '
     max = 30
  case mfield = 'm2'
     mname = 'Math Score 2 '
     max = 15
  case mfield = 'm3'
     mname = 'Math Score 3 '
     max = 72
  case mfield = 'mt'
     mname = 'Total Math Score  '
     max = 117
  otherwise
     mname = 'Selected Field'
endcase

* SET DEFAULT VALUES FOR VARIABLES
ethnic = 0
mpfield = mfield+'per'
n1 = 0
n2 = 0
n3 = 0
```

```
n4 = 0
n5 = 0
n11 = 0
n12 = 0
n13 = 0
n21 = 0
n22 = 0
n23 = 0
n31 = 0
n32 = 0
n33 = 0
n41 = 0
n42 = 0
n43 = 0
n51 = 0
n52 = 0
n53 = 0
np11 = 0
np12 = 0
np13 = 0
np21 = 0
np22 = 0
np23 = 0
np31 = 0
np32 = 0
np33 = 0
np41 = 0
np42 = 0
np43 = 0
np51 = 0
np52 = 0
np53 = 0
p11 = 0.00
p12 = 0.00
p13 = 0.00
p21 = 0.00
p22 = 0.00
p23 = 0.00
p31 = 0.00
p32 = 0.00
p33 = 0.00
p41 = 0.00
p42 = 0.00
p43 = 0.00
p51 = 0.00
p52 = 0.00
p53 = 0.00
store '84' to msyear
store '86' to meyear
store 'N' to ans                          &&  ASK USER FOR REPORT PARAMETERS
store '  ' to mgrade
store '50' to mper
@  6,2 say "Hard Copy? " get ans
@  8,2 say "Grade?     " get mgrade
@ 10,2 say "From Year? " get msyear
```

```
@ 12,2 say "To   Year? " get meyear
@ 14,2 say "Percentile?" get mper
read
if upper(ans) ='Y'
  hard = .t.
else
  hard = .f.
endif
do get_data

*PRINT REPORT
if hard
   set device to print
   do p_print
   eject
   set device to screen
  else
   set color on
   set status off
   do p_head
   wait
   clear
   do p_xaxis
   do p_yaxis
   do p_show
   wait " "
   set status on
   set color to w/b
*endif
return

*********************************************************
*COLLECT AND TOTAL THE DATA
Procedure get_data
select studs
set index to studs_num                    &&  SET RELATIONS SO THAT
select subj                               &&  STUDENT INFORMATION IS
set relation to stud_num into studs       &&  AVAILABLE FOR WHATEVER
select ach                                &&  RECORD IS BEING LOOKED AT
set relation to stud_num into studs
select sch
set relation to stud_num into studs
select ach
go top
vgrade = val(mgrade)
vmper = val(mper)
do while .not. eof()                      &&  STEP THROUGH THE RECORDS
   if studs->grade = vgrade
   do case
      case ach->year = val(msyear)
           do case
              case studs->ethnic = 1
                   np11 = iif(&mpfield>vmper,np11+1,np11)
                   n11  = iif(&mpfield>=0,n11+1,n11)
                   p11  = np11/n11
```

```
         case studs->ethnic = 2
              np21 = iif(&mpfield>vmper,np21+1,np21)
              n21  = iif(&mpfield>=0,n21+1,n21)
              p21  = np21/n21
         case studs->ethnic = 3
              np31 = iif(&mpfield>vmper,np31+1,np31)
              n31  = iif(&mpfield>=0,n31+1,n31)
              p31  = np31/n31
         case studs->ethnic = 4
              np41 = iif(&mpfield>vmper,np41+1,np41)
              n41  = iif(&mpfield>=0,n41+1,n41)
              p41  = np41/n41
         case studs->ethnic = 5
              np51 = iif(&mpfield>vmper,np51+1,np51)
              n51  = iif(&mpfield>=0,n51+1,n51)
              p51  = np51/n51
      endcase
case ach->year = val(msyear) + 1
      do case
         case studs->ethnic = 1
              np12 = iif(&mpfield>vmper,np12+1,np12)
              n12  = iif(&mpfield>=0,n12+1,n12)
              p12  = np12/n12
         case studs->ethnic = 2
              np22 = iif(&mpfield>vmper,np22+1,np22)
              n22  = iif(&mpfield>=0,n22+1,n22)
              p22  = np22/n22
         case studs->ethnic = 3
              np32 = iif(&mpfield>vmper,np32+1,np32)
              n32  = iif(&mpfield>=0,n32+1,n32)
              p32  = np32/n32
         case studs->ethnic = 4
              np42 = iif(&mpfield>vmper,np42+1,np42)
              n42  = iif(&mpfield>=0,n42+1,n42)
              p42  = np42/n42
         case studs->ethnic = 5
              np52 = iif(&mpfield>vmper,np52+1,np52)
              n52  = iif(&mpfield>=0,n52+1,n52)
              p52  = np52/n52
    'endcase
case ach->year = val(meyear)
      do case
         case studs->ethnic = 1
              np13 = iif(&mpfield>vmper,np13+1,np13)
              n13  = iif(&mpfield>=0,n13+1,n13)
              p13  = np13/n13
         case studs->ethnic = 2
              np23 = iif(&mpfield>vmper,np23+1,np23)
              n23  = iif(&mpfield>=0,n23+1,n23)
              p23  = np23/n23
         case studs->ethnic = 3
              np33 = iif(&mpfield>vmper,np33+1,np33)
              n33  = iif(&mpfield>=0,n33+1,n33)
              p33  = np33/n33
         case studs->ethnic = 4
```

```
                    np43 = iif(&mpfield>vmper,np43+1,np43)
                    n43  = iif(&mpfield>=0,n43+1,n43)
                    p43  = np43/n43
               case studs->ethnic = 5
                    np53 = iif(&mpfield>vmper,np53+1,np53)
                    n53  = iif(&mpfield>=0,n53+1,n53)
                    p53  = np53/n53
          endcase
       endcase
    endif
    skip
enddo
clear
n1 = int((n11+n12+n13)/3)
n2 = int((n21+n22+n23)/3)
n3 = int((n31+n32+n33)/3)
n4 = int((n41+n42+n43)/3)
n5 = int((n51+n52+n53)/3)
select studs
set index to students
return


*********************************************************
*PRINT PROCEDURE FOR HARD COPY
procedure p_print
*legend = ''
@ 3, 31 say 'School Level Report'
@ 6, 18 say 'Comparison of Achievement in Different Groups'
@ 8, 35 say 'Grade:    '+ str(&mgrade, 2)
@ 9, 35 say 'Year:     '+ str(&msyear, 2)+ '-' + str(&meyear, 2)
@ 10,24 say mname + ' by Ethnicity'
@ 14, 0 say 'PERCENTAGE OF STUDENTS ABOVE '+str(&mper,2)+' PERCENTILE'
h11 = 35 - int(p11 * 20)
h12 = 35 - int(p12 * 20)
h13 = 35 - int(p13 * 20)
h21 = 35 - int(p21 * 20)
h22 = 35 - int(p22 * 20)
h23 = 35 - int(p23 * 20)
h31 = 35 - int(p31 * 20)
h32 = 35 - int(p32 * 20)
h33 = 35 - int(p33 * 20)
h41 = 35 - int(p41 * 20)
h42 = 35 - int(p42 * 20)
h43 = 35 - int(p43 * 20)
h51 = 35 - int(p51 * 20)
h52 = 35 - int(p52 * 20)
h53 = 35 - int(p53 * 20)
loop1 = 15
do while loop1 <= 35
   st1 = ' '
   st2 = str(100 - (loop1 - 16) * 5, 3) + '%' + '+'
   st3 = '    |'
  do case
     case loop1 = 15
```

```
          yaxis = st1
     case loop1 = 16
          yaxis = st2
     case loop1 = 21
          yaxis = st2
     case loop1 = 26
          yaxis = st2
     case loop1 = 31
          yaxis = st2
     otherwise
          yaxis = st3
endcase
 do case
    case loop1 <= h11 - 1
         stamp11 = ' '
    case loop1 = h11
         stamp11 = str(int(p11 * 100), 3)
    case loop1 > h11
         stamp11 = 'B'
 endcase
 do case
    case loop1 <= h12 - 1
         stamp12 = ' '
    case loop1 = h12
         stamp12 = str(int(p12 * 100), 3)
    case loop1 > h12
         stamp12 = 'B'
 endcase
 do case
    case loop1 <= h13 - 1
         stamp13 = ' '
    case loop1 = h13
         stamp13 = str(int(p13 * 100), 3)
    case loop1 > h13
         stamp13 = 'B'
 endcase
 do case
    case loop1 <= h21 - 1
         stamp21 = ' '
    case loop1 = h21
         stamp21 = str(int(p21 * 100), 3)
    case loop1 > h21
         stamp21 = 'W'
 endcase
 do case
    case loop1 <= h22 - 1
         stamp22 = ' '
    case loop1 = h22
         stamp22 = str(int(p22 * 100), 3)
    case loop1 > h22
         stamp22 = 'W'
 endcase
 do case
    case loop1 <= h23 - 1
         stamp23 = ' '
```

```
      case loop1 = h23
           stamp23 = str(int(p23 * 100), 3)
      case loop1 > h23
           stamp23 = 'W'
   endcase
   do case
      case loop1 <= h31 - 1
           stamp31 = ' '
      case loop1 = h31
           stamp31 = str(int(p31 * 100), 3)
      case loop1 > h31
           stamp31 = 'A'
   endcase
   do case
      case loop1 <= h32 - 1
           stamp32 = ' '
      case loop1 = h32
           stamp32 = str(int(p32 * 100), 3)
      case loop1 > h32
           stamp32 = 'A'
   endcase
   do case
      case loop1 <= h33 - 1
           stamp33 = ' '
      case loop1 = h33
           stamp33 = str(int(p33 * 100), 3)
      case loop1 > h33
           stamp33 = 'A'
   endcase
   do case
      case loop1 <= h41 - 1
           stamp41 = ' '
      case loop1 = h41
           stamp41 = str(int(p41 * 100), 3)
      case loop1 > h41
           stamp41 = 'L'
   endcase
   do case
      case loop1 <= h42 - 1
           stamp42 = ' '
      case loop1 = h42
           stamp42 = str(int(p42 * 100), 3)
      case loop1 > h42
           stamp42 = 'L'
   endcase
   do case
      case loop1 <= h43 - 1
           stamp43 = ' '
      case loop1 = h43
           stamp43 = str(int(p43 * 100), 3)
      case loop1 > h43
           stamp43 = 'L'
   endcase
   do case
      case loop1 <= h51 - 1
```

```
            stamp51 = ' '
         case loop1 = h51
            stamp51 = str(int(p51 * 100), 3)
         case loop1 > h51
            stamp51 = 'O'
      endcase
      do case
         case loop1 <= h52 - 1
            stamp52 = ' '
         case loop1 = h52
            stamp52 = str(int(p52 * 100), 3)
         case loop1 > h52
            stamp52 = 'O'
      endcase
      do case
         case loop1 <= h53 - 1
            stamp53 = ' '
         case loop1 = h53
            stamp53 = str(int(p53 * 100), 3)
         case loop1 > h53
            stamp53 = 'O'
      endcase
      @ loop1, 0 say yaxis
      @ loop1, 6 say stamp11
      @ loop1,10 say stamp12
      @ loop1,14 say stamp13
      @ loop1,20 say stamp21
      @ loop1,24 say stamp22
      @ loop1,28 say stamp23
      @ loop1,34 say stamp31
      @ loop1,38 say stamp32
      @ loop1,42 say stamp33
      @ loop1,48 say stamp41
      @ loop1,52 say stamp42
      @ loop1,56 say stamp43
      @ loop1,62 say stamp51
      @ loop1,66 say stamp52
      @ loop1,70 say stamp53
      loop1 = loop1 + 1
   enddo
   @ 36, 2 say '0%+-'
   @ 36, 6 say replicate('+---+---+-----',4)
   @ 36,62 say '+---+---+-- '
   @ 37, 0 say 'Year:'
   @ 37, 6 say str(&msyear,2)
   @ 37,10 say str(&msyear+1,2)
   @ 37,14 say str(&meyear,2)
   @ 37,20 say str(&msyear,2)
   @ 37,24 say str(&msyear+1,2)
   @ 37,28 say str(&meyear,2)
   @ 37,34 say str(&msyear,2)
   @ 37,38 say str(&msyear+1,2)
   @ 37,42 say str(&meyear,2)
   @ 37,48 say str(&msyear,2)
   @ 37,52 say str(&msyear+1,2)
```

```
@ 37,56 say str(&meyear,2)
@ 37,62 say str(&msyear,2)
@ 37,66 say str(&msyear+1,2)
@ 37,70 say str(&meyear,2)
@ 38, 8 say 'BLACK'
@ 38,22 say 'WHITE'
@ 38,36 say 'ASIAN'
@ 38,50 say 'LATINO'
@ 38,64 say 'OTHER'
@ 38,74 say 'Ethnic'
@ 39, 8 say '(n=' + str(n1,2) + ')'
@ 39,22 say '(n=' + str(n2,2) + ')'
@ 39,36 say '(n=' + str(n3,2) + ')'
@ 39,50 say '(n=' + str(n4,2) + ')'
@ 39,64 say '(n=' + str(n5,2) + ')'
@ 39,74 say 'Group'
return


*********************************************************
*DISPLAY HEADING ON SCREEN
Procedure p_head
clear
?
?
? '                              School Level Report'
?
? '                 Comparison of Achievement in Different Groups'
? '                              '
? '                                        Grade: '+ mgrade
? '                                        Year:  '+ msyear + '-' + meyear
? '                       '+mname+ ' by Ethnicity'
?
?
?
return


*********************************************************
*SHOW PROCEDURE FOR SCREEN DISPLAY
procedure p_show
loop1 = 1
do while loop1 <= 5
   store 1 to loop2
   do case
      case loop1 = 1
           set color to gr
      case loop1 = 2
           set color to w
      case loop1 = 3
           set color to gr+
      case loop1 = 4
           set color to r
      case loop1 = 5
           set color to g
```

```
   endcase
   do while loop2 <= 3
      do case
         case loop2 = 1
              ascii = 179
         case loop2 = 2
              ascii = 186
         case loop2 = 3
              ascii = 219
      endcase
      ynum = 'p' + str(loop1,1) + str(loop2,1)
      y = &ynum * 20
      col = loop1 * 14 + loop2 * 4 - 12
      height = 21 - int(y)
      do p_bars with height,col,ascii
      loop2 = loop2 + 1
   enddo
   loop1 = loop1 + 1
enddo
return


************************************************************
*DISPLAY X AXIS ON SCREEN
procedure p_xaxis
set status off
@ 0,0 say 'PERCENTAGE OF STUDENTS ABOVE '+ str(&mper,2) + ' PERCENTILE'
@ 21,4 say '+-'
@ 21,6 say replicate('+---+---+-----',4)
@ 21,62 say '+---+---+-- '
@ 22, 2 say 'n:'
@ 22, 6 say str(n11,2)
@ 22,10 say str(n12,2)
@ 22,14 say str(n13,2)
@ 22,20 say str(n21,2)
@ 22,24 say str(n22,2)
@ 22,28 say str(n23,2)
@ 22,34 say str(n31,2)
@ 22,38 say str(n32,2)
@ 22,42 say str(n33,2)
@ 22,48 say str(n41,2)
@ 22,52 say str(n42,2)
@ 22,56 say str(n43,2)
@ 22,62 say str(n51,2)
@ 22,66 say str(n52,2)
@ 22,70 say str(n53,2)
@ 23, 8 say 'BLACK'
@ 23,22 say 'WHITE'
@ 23,36 say 'ASIAN'
@ 23,50 say 'LATINO'
@ 23,64 say 'OTHER'
@ 23,74 say 'Ethnic'
@ 24, 8 say '(n=' + str(n1,2) + ')'
@ 24,22 say '(n=' + str(n2,2) + ')'
@ 24,36 say '(n=' + str(n3,2) + ')'
```

```
@ 24,50 say '(n=' + str(n4,2) + ')'
@ 24,64 say '(n=' + str(n5,2) + ')'
@ 24,74 say 'Group'
return

*********************************************************
*DISPLAY Y AXIS ON SCREEN
procedure p_yaxis
@ 21,2 say '0%'
@ 21,4 say '+'
store 20 to looper
do while looper >= 1
   if looper = 1  .or. looper =  6 .or. looper = 11 .or. looper = 16
      do case
         case looper = 1
              @ looper,0 say '100%'
              @ looper,4 say '+'
         case looper = 6
              @ looper,1 say '75%'
              @ looper,4 say '+'
         case looper = 11
              @ looper,1 say '50%'
              @ looper,4 say '+'
         case looper = 16
              @ looper,1 say '25%'
              @ looper,4 say '+'
      endcase
    else
      @ looper,4 say chr(179)
   endif
   looper = looper - 1
enddo
@ 1,76 say chr(179)
@ 2,76 say chr(179) + '-' + str(&msyear,2)
@ 3,76 say chr(179)
@ 6,76 say chr(186)
@ 7,76 say chr(186) + '-' + str(&msyear+1,2)
@ 8,76 say chr(186)
@ 11,76 say chr(219)
@ 12,76 say chr(219) + '-' + str(&meyear,2)
@ 13,76 say chr(219)
return


*********************************************************
*DISPLAY BARS ON SCREEN
procedure p_bars
parameters height,col,ascii
row = 20
do while row >= height
   @ row,col say chr(ascii)
   row = row - 1
enddo
@ row+1, col-1 say str(int(&ynum*100),3) + '%'
```

```
**********************************************************************
**
**      Program:  Bar graph program II
**
**      Use:  Generate a bar graph for supplied field
**            comparing special programs
**
**      Programmer:  Qi Sen
**
**********************************************************************


**********************************************************************
*       MAIN BAR PROCEDURE
*       CALLS SUBROUTINES
procedure graph
   parameters mfield
set escape on

do case                         && DETERMINE THE TITLE AND MAXIMUM
  case mfield = 'r1'            && FOR RAW SCORES
     mname = 'Reading Score 1 '
     max = 20
  case mfield = 'r2'
     mname = 'Reading Score 2 '
     max = 20
  case mfield = 'r3'
     mname = 'Reading Score 3 '
     max = 45
  case mfield = 'rt'
     mname = 'Total Reading Score '
     max = 85
  case mfield = 'm1'
     mname = 'Math Score 1 '
     max = 30
  case mfield = 'm2'
     mname = 'Math Score 2 '
     max = 15
  case mfield = 'm3'
     mname = 'Math Score 3 '
     max = 72
  case mfield = 'mt'
     mname = 'Total Math Score  '
     max = 117
  otherwise
     mname = 'Selected Field'
endcase

* SET DEFAULT VALUES FOR VARIABLES
mpfield = mfield+'per'
sp1 = .t.
sp2 = .t.
sp3 = .t.
sp4 = .t.
sp5 = .t.
```

```
sp6 = .t.
n1 = 0
n2 = 0
n3 = 0
n4 = 0
n5 = 0
n6 = 0
np1 = 0
np2 = 0
np3 = 0
np4 = 0
np5 = 0
np6 = 0
p1 = 0.00
p2 = 0.00
p3 = 0.00
p4 = 0.00
p5 = 0.00
p6 = 0.00
store '86' to myear
store 'N' to ans                          &&  ASK USER FOR REPORT PARAMETERS
store '   ' to mgrade
store '50' to mper
@  6,2 say "Hard Copy?" get ans
@  8,2 say "Grade?" get mgrade
@ 10,2 say "Year?" get myear
@ 12,2 say "Percentile" get mper
read
if upper(ans) ='Y'
  hard = .t.
 else
  hard = .f.
endif
do get_data

*PRINT REPORT
if hard
   set device to print
   do p_print
   eject
   set device to screen
  else
   set color on
   set status off
   do p_head
   wait
   clear
   do p_xaxis
   do p_yaxis
   do p_show
   wait " "
   set status on
   set color to w/b
endif
return
```

```
*************************************************************
*COLLECT AND TOTAL THE DATA
Procedure get_data
select studs
set index to studs_num                          &&  SET RELATIONS SO THAT
select subj                                     &&  STUDENT INFORMATION IS
set relation to stud_num into studs             &&  AVAILABLE FOR WHATEVER
select ach                                      &&  RECORD IS BEING LOOKED AT
set relation to stud_num into studs
select sch
set relation to stud_num into studs
select ach
go top
vgrade = val(mgrade)
vyear = val(myear)
vmper = val(mper)
do while .not. eof()                            &&  STEP THROUGH THE RECORDS
  if studs->grade = vgrade  .and. ach->year = vyear
      if   studs->sp1
           np1 = iif(&mpfield>vmper,np1+1,np1)
           n1  = iif(&mpfield>=0,n1+1,n1)
      endif
      if   studs->sp2
           np2 = iif(&mpfield>vmper,np2+1,np2)
           n2  = iif(&mpfield>=0,n2+1,n2)
      endif
      if   studs->sp3
           np3 = iif(&mpfield>vmper,np3+1,np3)
           n3  = iif(&mpfield>=0,n3+1,n3)
      endif
      if   studs->sp4
           np4 = iif(&mpfield>vmper,np4+1,np4)
           n4  = iif(&mpfield>=0,n4+1,n4)
      endif
      if   studs->sp5
           np5 = iif(&mpfield>vmper,np5+1,np5)
           n5  = iif(&mpfield>=0,n5+1,n5)
      endif
      if   studs->sp6
           np6 = iif(&mpfield>vmper,np6+1,np6)
           n6  = iif(&mpfield>=0,n6+1,n6)
      endif
  endif
  skip
enddo
clear
p1 = np1/n1
p2 = np2/n2
p3 = np3/n3
p4 = np4/n4
p5 = np5/n5
p6 = np6/n6
select studs
set index to students
```

```
return

*********************************************************
*PRINT PROCEDURE FOR HARD COPY
procedure p_print
@ 3, 31 say 'School Level Report'
@ 6, 16 say 'Comparison of Achievement in Different Programs'
@ 8, 35 say 'Grade:    '+ str(&mgrade, 2)
@ 9, 35 say 'Year:     '+ str(&myear, 2)
@ 10,24 say mname + ' by Program'
@ 14, 0 say 'PERCENTAGE OF STUDENTS ABOVE '+str(&mper,2)+' PERCENTILE'
y1 = p1 * 20
h1 = 35 - int(y1)
y2 = p2 * 20
h2 = 35 - int(y2)
y3 = p3 * 20
h3 = 35 - int(y3)
y4 = p4 * 20
h4 = 35 - int(y4)
y5 = p5 * 20
h5 = 35 - int(y5)
y6 = p6 * 20
h6 = 35 - int(y6)
loop1 = 15
do while loop1 <= 35
   st1 = ' '
   st2 = str(100 - (loop1 - 16) * 5, 3) + '%' +  +'
   st3 = '    ¦'
   stamp1 = ''
   stamp2 = ''
   stamp3 = ''
   stamp4 = ''
   stamp5 = ''
   stamp6 = ''
   do case
      case loop1 = 15
           yaxis = st1
      case loop1=16 .or. loop1=21 .or. loop1=26 .or. loop1=31
           yaxis = st2
      otherwise
           yaxis = st3
   endcase
   do case
      case loop1 <= h1 - 1
           stamp1 = ' '
      case loop1 = h1
           stamp1 = str(int(p1 * 100), 3) + '%'
      case loop1 > h1
           stamp1 = '##'
   endcase
   do case
      case loop1 <= h2 - 1
           stamp2 = ' '
      case loop1 = h2
```

```
            stamp2 = str(int(p2 * 100), 3) + '%'
         case loop1 > h2
            stamp2 = '##'
      endcase
      do case
         case loop1 <= h3 - 1
            stamp3 = ' '
         case loop1 = h3
            stamp3 = str(int(p3 * 100), 3) + '%'
         case loop1 > h3
            stamp3 = '##'
      endcase
      do case
         case loop1 <= h4 - 1
            stamp4 = ' '
         case loop1 = h4
            stamp4 = str(int(p4 * 100), 3) + '%'
         case loop1 > h4
            stamp4 = '##'
      endcase
      do case
         case loop1 <= h5 - 1
            stamp5 = ' '
         case loop1 = h5
            stamp5 = str(int(p5 * 100), 3) + '%'
         case loop1 > h5
            stamp5 = '##'
      endcase
      do case
         case loop1 <= h6 - 1
            stamp6 = ' '
         case loop1 = h6
            stamp6 = str(int(p6 * 100), 3) + '%'
         case loop1 > h6
            stamp6 = '##'
      endcase
      @ loop1, 0 say yaxis
      @ loop1, 8 say stamp1
      @ loop1,20 say stamp2
      @ loop1,32 say stamp3
      @ loop1,44 say stamp4
      @ loop1,56 say stamp5
      @ loop1,68 say stamp6
      loop1 = loop1 + 1
   enddo
   @ 36, 2 say '0%+'
   @ 36, 5 say '---+'
   @ 36, 9 say replicate('----------+', 5)
   @ 36,69 say '--  Special'
   @ 37, 6 say 'CHAP1'
   @ 37,18 say 'GIFTD'
   @ 37,30 say 'BILIN'
   @ 37,42 say 'STATE'
   @ 37,54 say 'MU'
   @ 37,66 say 'SCHAV'
```

```
@ 37,73 say 'Program'
@ 38, 6 say '(n=' + str(n1, 2) + ')'
@ 38,18 say '(n=' + str(n2, 2) + ')'
@ 38,30 say '(n=' + str(n3, 2) + ')'
@ 38,42 say '(n=' + str(n4, 2) + ')'
@ 38,54 say '(n=' + str(n5, 2) + ')'
@ 38,66 say '(n=' + str(n6, 2) + ')'
return


*********************************************************
*SHOW PROCEDURE FOR SCREEN DISPLAY
procedure p_show
loop1 = 1
do while loop1 <= 6
   do case
      case loop1 = 1
           set color to gr
      case loop1 = 2
           set color to w
      case loop1 = 3
           set color to gr+
      case loop1 = 4
           set color to r
      case loop1 = 5
           set color to g
      case loop1 = 6
           set color to bg
   endcase
   ynum = 'p' + str(loop1,1)
   y = &ynum * 20
   col = (loop1-1) * 12 + 8
   height = 21 - int(y)
   do p_bars with height,col
   loop1 = loop1 + 1
enddo
return


*********************************************************
*DISPLAY HEADING ON SCREEN
Procedure p_head
clear
?
?
? '                          School Level Report'
?
? '             Comparison of Achievement in Different Programs'
? '                          '
? '                                  Grade: '+ mgrade
? '                                  Year:  '+ myear
? '                     '+mname+ ' by Program'
?
?
```

```
?
return


*********************************************************
*DISPLAY X AXIS ON SCREEN
procedure p_xaxis
set status off
@ 0,0 say 'PERCENTAGE OF STUDENTS ABOVE '+ str(&mper,2) + ' PERCENTILE'
@ 21,4 say '+'
@ 21,5 say '---+'
@ 21, 9 say replicate('-----------+',5)
@ 21,69 say '--  Special'
@ 22, 6 say 'CHAP1'
@ 22,18 say 'GIFTD'
@ 22,30 say 'BILIN'
@ 22,42 say 'STATE'
@ 22,54 say 'MU'
@ 22,66 say 'SCHAV'
@ 22,73 say 'Program'
@ 23, 6 say '(n=' + str(n1,2) + ')'
@ 23,18 say '(n=' + str(n2,2) + ')'
@ 23,30 say '(n=' + str(n3,2) + ')'
@ 23,42 say '(n=' + str(n4,2) + ')'
@ 23,54 say '(n=' + str(n5,2) + ')'
@ 23,66 say '(n=' + str(n6,2) + ')'
return


*********************************************************
*DISPLAY Y AXIS ON SCREEN
procedure p_yaxis
@ 21,4 say '+'
store 1 to looper
@ 21,2 say '0%'
store 20 to looper
do while looper >= 1
   if looper = 1  .or. looper =  6 .or. looper = 11 .or. looper = 16
      do case
         case looper = 1
              @ looper,0 say '100%'
              @ looper,4 say '+'
         case looper = 6
              @ looper,1 say '75%'
              @ looper,4 say '+'
         case looper = 11
              @ looper,1 say '50%'
              @ looper,4 say '+'
         case looper = 16
              @ looper,1 say '25%'
              @ looper,4 say '+'
      endcase
    else
```

```
      @ looper,4 say '¦'
   endif
   looper = looper - 1
enddo
return


*********************************************************
*DISPLAY BARS ON SCREEN
procedure p_bars
parameters height,col
row = 20
do while row >= height
   @ row,col say chr(219)
   row = row - 1
enddo
@ row+1, col+1 say str(int(&ynum*100),3) + '%'
return
```

```
*****************************************************************
**
**      Program:  Bar graph program III
**
**      Use:  Generate a bar graph for supplied field
**            comparing between sexes
**
**      Programmer:  Qi Sen
**
*****************************************************************


*****************************************************************
*       MAIN BAR PROCEDURE
*       CALLS SUBROUTINES
procedure graph
   parameters mfield
set escape on

do case                         && DETERMINE THE TITLE AND MAXIMUM
  case mfield = 'r1'            && FOR RAW SCORES
     mname = 'Reading Score 1 '
     max = 20
  case mfield = 'r2'
     mname = 'Reading Score 2 '
     max = 20
  case mfield = 'r3'
     mname = 'Reading Score 3 '
     max = 45
  case mfield = 'rt'
     mname = 'Total Reading Score '
     max = 85
  case mfield = 'm1'
     mname = 'Math Score 1 '
     max = 30
  case mfield = 'm2'
     mname = 'Math Score 2 '
     max = 15
  case mfield = 'm3'
     mname = 'Math Score 3 '
     max = 72
  case mfield = 'mt'
     mname = 'Total Math Score  '
     max = 117
  otherwise
     mname = 'Selected Field'
endcase

* SET DEFAULT VALUES FOR VARIABLES
sex = 'F'
mpfield = mfield+'per'
n1 = 0
n2 = 0
n3 = 0
```

```
n11 = 0
n12 = 0
n13 = 0
n21 = 0
n22 = 0
n23 = 0
np11 = 0
np12 = 0
np13 = 0
np21 = 0
np22 = 0
np23 = 0
p11 = 0.00
p12 = 0.00
p13 = 0.00
p21 = 0.00
p22 = 0.00
p23 = 0.00
store '84' to msyear
store '86' to meyear
store 'N' to ans                          &&  ASK USER FOR REPORT PARAMETERS
store '  ' to mgrade
store '50' to mper
store 'F' to msex
@  6,2 say "Hard Copy? " get ans
@  8,2 say "Grade?     " get mgrade
@ 10,2 say "From Year? " get msyear
@ 12,2 say "To   Year? " get meyear
@ 14,2 say "Percentile?" get mper
read
if upper(ans) ='Y'
  hard = .t.
else
  hard = .f.
endif
do get_data

*PRINT REPORT
if hard
   set device to print
   do p_print
   eject
   set device to screen
  else
   set color on
   set status off
   do p_head
   wait
   clear
   do p_xaxis
   do p_yaxis
   do p_show
   wait " "
   set status on
   set color to w/b
```

```
return
*********************************************************
*COLLECT AND TOTAL THE DATA
Procedure get_data
select studs
set index to studs_num                          &&  SET RELATIONS SO THAT
select subj                                     &&  STUDENT INFORMATION IS
set relation to stud_num into studs             &&  AVAILABLE FOR WHATEVER
select ach                                      &&  RECORD IS BEING LOOKED AT
set relation to stud_num into studs
select sch
set relation to stud_num into studs
select ach
go top
vgrade = val(mgrade)
vmper = val(mper)
do while .not. eof()                            &&  STEP THROUGH THE RECORD
   if studs->grade = vgrade
   do case
      case ach->year = val(msyear)
           do case
              case studs->sex = chr(70)
                   np11 = iif(&mpfield>vmper,np11+1,np11)
                   n11  = iif(&mpfield>=0,n11+1,n11)
                   p11  = np11/n11
              case studs->sex = chr(77)
                   np21 = iif(&mpfield>vmper,np21+1,np21)
                   n21  = iif(&mpfield>=0,n21+1,n21)
                   p21  = np21/n21
           endcase
      case ach->year = val(msyear) + 1
           do case
              case studs->sex = chr(70)
                   np12 = iif(&mpfield>vmper,np12+1,np12)
                   n12  = iif(&mpfield>=0,n12+1,n12)
                   p12  = np12/n12
              case studs->sex = chr(77)
                   np22 = iif(&mpfield>vmper,np22+1,np22)
                   n22  = iif(&mpfield>=0,n22+1,n22)
                   p22  = np22/n22
           endcase
      case ach->year = val(meyear)
           do case
              case studs->sex = chr(70)
                   np13 = iif(&mpfield>vmper,np13+1,np13)
                   n13  = iif(&mpfield>=0,n13+1,n13)
                   p13  = np13/n13
              case studs->sex = chr(77)
                   np23 = iif(&mpfield>vmper,np23+1,np23)
                   n23  = iif(&mpfield>=0,n23+1,n23)
                   p23  = np23/n23
           endcase
       endcase
   endif
   skip
```

```
enddo
clear
n1 = int((n11+n12+n13)/3)
n2 = int((n21+n22+n23)/3)
select studs
set index to students
return


**********************************************************
*PRINT PROCEDURE FOR HARD COPY
procedure p_print
@ 3, 31 say 'School Level Report'
@ 6, 18 say 'Comparison of Achievement in Different Groups'
@ 8, 35 say 'Grade:    '+ str(&mgrade, 2)
@ 9, 35 say 'Year:     '+ str(&msyear, 2)+ '-' + str(&meyear, 2)
@ 10,24 say mname + ' by  Gender'
@ 14, 0 say 'PERCENTAGE OF STUDENTS ABOVE '+str(&mper,2)+' PERCENTILE'
h11 = 35 - int(p11 * 20)
h12 = 35 - int(p12 * 20)
h13 = 35 - int(p13 * 20)
h21 = 35 - int(p21 * 20)
h22 = 35 - int(p22 * 20)
h23 = 35 - int(p23 * 20)
loop1 = 15
do while loop1 <= 35
   st1 = ' '
   st2 = str(100 - (loop1 - 16) * 5, 3) + '%' + '+'
   st3 = '    |'
  do case
     case loop1 = 15
          yaxis = st1
     case loop1 = 16
          yaxis = st2
     case loop1 = 21
          yaxis = st2
     case loop1 = 26
          yaxis = st2
     case loop1 = 31
          yaxis = st2
     otherwise
          yaxis = st3
  endcase
   do case
      case loop1 <= h11 - 1
           stamp11 = ' '
      case loop1 = h11
           stamp11 = str(int(p11 * 100), 3)
      case loop1 > h11
           stamp11 = '#'
   endcase
   do case
      case loop1 <= h12 - 1
           stamp12 = ' '
      case loop1 = h12
```

```
            stamp12 = str(int(p12 * 100), 3)
         case loop1 > h12
            stamp12 = '#'
      endcase
      do case
         case loop1 <= h13 - 1
            stamp13 = ' '
         case loop1 = h13
            stamp13 = str(int(p13 * 100), 3)
         case loop1 > h13
            stamp13 = '#'
      endcase
      do case
         case loop1 <= h21 - 1
            stamp21 = ' '
         case loop1 = h21
            stamp21 = str(int(p21 * 100), 3)
         case loop1 > h21
            stamp21 = 'I'
      endcase
      do case
         case loop1 <= h22 - 1
            stamp22 = ' '
         case loop1 = h22
            stamp22 = str(int(p22 * 100), 3)
         case loop1 > h22
            stamp22 = 'I'
      endcase
      do case
         case loop1 <= h23 - 1
            stamp23 = ' '
         case loop1 = h23
            stamp23 = str(int(p23 * 100), 3)
         case loop1 > h23
            stamp23 = 'I'
      endcase
      @ loop1, 0 say yaxis
      @ loop1,15 say stamp11
      @ loop1,22 say stamp12
      @ loop1,29 say stamp13
      @ loop1,50 say stamp21
      @ loop1,57 say stamp22
      @ loop1,64 say stamp23
      loop1 = loop1 + 1
   enddo
   @ 36, 2 say '0%+'
   @ 36, 5 say replicate('----------+------+------+----------',2)
   @ 37, 0 say 'Year:'
   @ 37,14 say str(&msyear,2)
   @ 37,21 say str(&msyear+1,2)
   @ 37,28 say str(&meyear,2)
   @ 37,49 say str(&msyear,2)
   @ 37,56 say str(&msyear+1,2)
   @ 37,63 say str(&meyear,2)
   @ 38,19 say 'FEMALE'
```

```
@ 38,55 say 'MALE'
@ 38,70 say 'Gender'
@ 39,19 say '(n=' + str(n1,2) + ')'
@ 39,55 say '(n=' + str(n2,2) + ')'
return


*********************************************************
*DISPLAY HEADING ON SCREEN
Procedure p_head
clear
?
?
? '                          School Level Report'
?
? '              Comparison of Achievement in Different Groups'
? '                          '
? '                                   Grade: '+ mgrade
? '                                   Year:  '+ msyear + '-' + meyear
? '                    '+mname+ '    by Gender'
?
?
?
return


*********************************************************
*SHOW PROCEDURE FOR SCREEN DISPLAY
procedure p_show
loop1 = 1
do while loop1 <= 2
   store 1 to loop2
   do case
      case loop1 = 1
           ascii = 12
      case loop1 = 2
           ascii = 11
   endcase
   do while loop2 <= 3
      do case
         case loop2 = 1
              set color to bg
         case loop2 = 2
              set color to r
         case loop2 = 3
              set color to gr+
      endcase
      ynum = 'p' + str(loop1,1) + str(loop2,1)
      y = &ynum * 20
      col = loop1 * 35 + loop2 * 7 - 27
      height = 21 - int(y)
      do p_bars with height,col,ascii
      loop2 = loop2 + 1
   enddo
   loop1 = loop1 + 1
```

```
enddo
return


*************************************************************
*DISPLAY X AXIS ON SCREEN
procedure p_xaxis
set status off
@ 0,0 say 'PERCENTAGE OF STUDENTS ABOVE '+ str(&mper,2) + ' PERCENTILE'
@ 21,4 say '+'
@ 21,5 say replicate('----------+------+------+----------',2)
@ 22, 0 say 'Year:'
@ 22,14 say str(&msyear,2)
@ 22,21 say str(&msyear+1,2)
@ 22,28 say str(&meyear,2)
@ 22,49 say str(&msyear,2)
@ 22,56 say str(&msyear+1,2)
@ 22,63 say str(&meyear,2)
@ 23,19 say 'FEMALE'
@ 23,55 say 'MALE'
@ 23,70 say 'Gender'
@ 24,19 say '(n=' + str(n1,2) + ')'
@ 24,55 say '(n=' + str(n2,2) + ')'
return

*************************************************************
*DISPLAY Y AXIS ON SCREEN
procedure p_yaxis
@ 21,2 say '0%'
@ 21,4 say '+'
store 20 to looper
do while looper >= 1
   if looper = 1  .or. looper =  6 .or. looper = 11 .or. looper = 16
      do case
         case looper = 1
              @ looper,0 say '100%'
              @ looper,4 say '+'
         case looper = 6
              @ looper,1 say '75%'
              @ looper,4 say '+'
         case looper = 11
              @ looper,1 say '50%'
              @ looper,4 say '+'
         case looper = 16
              @ looper,1 say '25%'
              @ looper,4 say '+'
      endcase
    else
      @ looper,4 say chr(179)
   endif
   looper = looper - 1
enddo
return
```

```
                    C H O O S E   T Y P E   O F   R E P O R T :

                              1. STUDENT AT A GLANCE
                              2. TEST SCORES OVER TIME
                              3. COMPARISON AMONG GROUPS

                              0. EXIT

                                    select  1

Command          ||<C:>||ACH                    ||Rec: 1/228          ||      ||

  Teacher?  (want a list?) Y

Command          ||<C:>||ACH                    ||Rec: 1/228          ||      ||
 teacher
 Brown
 Jackson
 Jameson
 Standar
 Testing

Press any key to continue...
```

```
Command          ||<C:>||STUDS                    ||Rec: 14/81          ||      ||

Which teacher? Brown
Hard copy? Y
```

```
Command          ||<C:>||STUDS                    ||Rec: 51/81          ||      ||
```

STUDENTS AT A GLANCE
Teacher: Brown 08/18/87

Student Number	Student Name	GRADE	SPR GRP	ABS	READ %	RDVAL	MATH %	MTVAL	AMTHW	PRHLP	PRSUP
7883432	Alexander, Terr	2	.	3	77	3.4	39	3.3	4.0	3.2	4.0
4321339	Andrews, Sarah	2	T	7	99	*	59	*	*	*	*
7783216	Chambers, Sharo	2	.	11	70	3.3	34	3.0	1.2	0.0	0.0
9849030	Connors, Daniel	2	.	7	62	1.1	49	2.2	2.3	3.0	4.4
7890322	Donaldson, Mark	2	.	7	*	2.5	*	3.2	3.4	4.3	2.4
3324870	Edwards, James	2	T	20	56	2.3	54	4.0	3.0	1.4	1.5
4335314	Johnson, Debbie	2	I	8	29	2.2	55	2.4	3.4	2.0	3.0
5678390	Jones, Mary	2	G	10	66	1.0	36	3.0	1.2	1.3	2.0
7890232	Marshall, Diann	2	.	10	57	2.3	50	3.0	1.2	1.0	1.0
7787568	Monroe, Thomas	2	.	9	63	4.0	37	3.4	2.3	1.0	1.0
4439382	Nadar, Benjamin	2	G	11	57	3.3	34	2.2	3.0	1.4	1.2
7783219	Owens, Ronald	2	G	12	67	2.0	41	3.0	3.0	2.4	2.3
3321332	Parker, Karen	2	GT	10	52	3.3	71	4.0	1.0	1.1	1.0
7777432	Peters, Mike	2	G	11	57	2.2	36	1.0	2.2	1.4	2.3
4343210	Pike, Charles	2	I	8	23	2.1	35	2.0	2.3	2.0	3.0
6753210	Rogers, Grace	2	.	10	57	1.1	47	2.3	2.0	1.3	4.0
7798321	Shaw, Tom	2	.	5	37	2.2	51	1.3	3.3	1.2	3.1
8498399	Sherwood, Steve	2	G	8	78	*	44	*	*	*	*
5226780	Tyler, John	2	.	5	70	1.4	38	3.1	2.2	1.2	1.3
7865308	Washington, Dav	2	G	13	49	3.0	33	3.4	3.0	2.3	3.0

```
*************************************************************
*DISPLAY BARS ON SCREEN
procedure p_bars
parameters height,col,ascii
row = 20
do while row >= height
   @ row,col say chr(ascii)
   row = row - 1
enddo
@ row+1, col-1 say str(int(&ynum*100),3) + '%'
return
```

```
C H O O S E   T Y P E   O F   R E P O R T :

                    1. STUDENT AT A GLANCE
                    2. TEST SCORES OVER TIME
                    3. COMPARISON AMONG GROUPS

                    0. EXIT

                    select  2

Command          ‖<C:>‖STUDS                ‖Rec: EOF/81        ‖      ‖
```

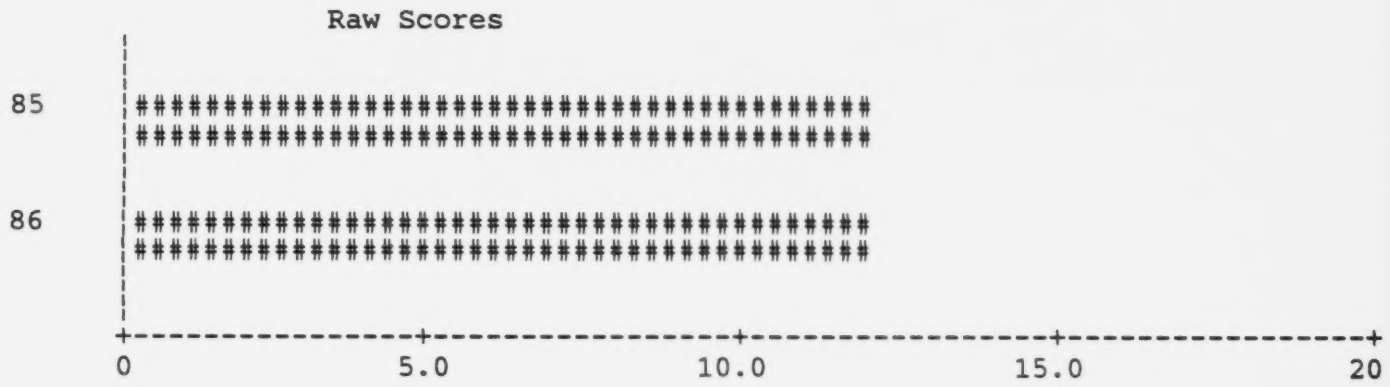
```
C H O O S E   F I E L D   T O   C O M P A R E

                                  1. Reading 1
                                  2. Reading 2
                                  3. Reading 3
Hard Copy? Y                      4. Reading Total
                                  5. Math 1
Teacher?  (want a list?) N        6. Math 2
Teacher? Brown                    7. Math 3
Grade?   2                        8. Math Total

                                  0. EXIT

                    select  1

Command          ‖<C:>‖STUDS                ‖Rec: EOF/81        ‖      ‖
```

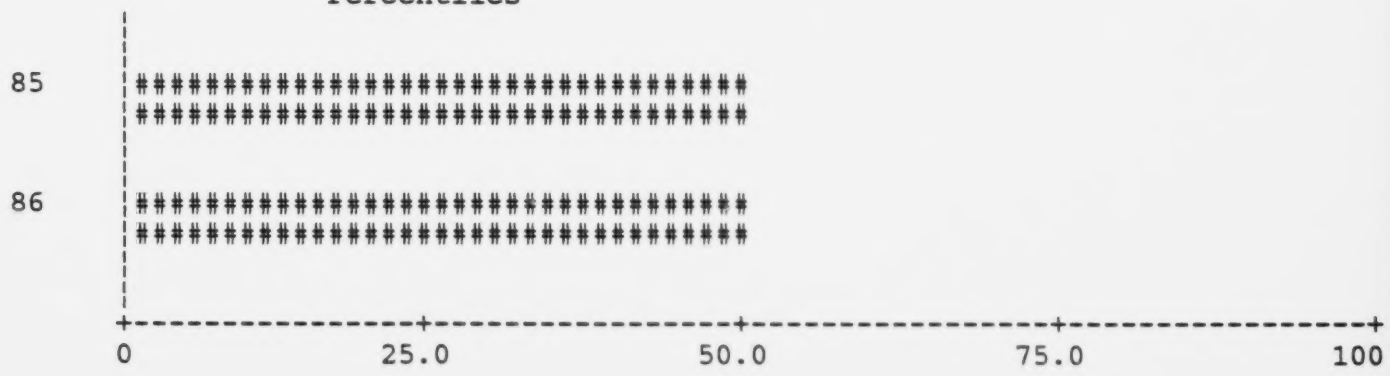
Comparison of Test Scores
Teacher: Brown
85 - 86

Grade: 2
Reading Score 1

Total number of students with data for 1986: 19
Average Raw score: 12.47
Average Percentile score: 51.00

Total number of students with data for 1985: 20
Average Raw score: 12.75
Average Percentile score: 51.00





```
                    C H O O S E   T Y P E   O F   R E P O R T :

                                1. STUDENT AT A GLANCE
                                2. TEST SCORES OVER TIME
                                3. COMPARISON AMONG GROUPS

                                0. EXIT
0
                                    select  3
```

```
Command          ‖<C:>‖STUDS                ‖Rec: 14/81          ‖      ‖
```

```
                    C H O O S E   T Y P E   O F   C O M P A R I S O N

                                1. AMONG ETHNIC GROUPS
                                2. AMONG SPECIAL PROGRAMS
                                3. BETWEEN SEXES

                                0. EXIT
                                    select  1
```

```
Command          ‖<C:>‖STUDS                ‖Rec: 14/81          ‖      ‖
```

```
                    C H O O S E   F I E L D   T O   C O M P A R E

Hard Copy?  Y
                                1. Reading 1
Grade?      4                   2. Reading 2
                                3. Reading 3
From Year?  84                  4. Reading Total
                                5. Math 1
To   Year?  86                  6. Math 2
                                7. Math 3
Percentile? 50                  8. Math Total

                                0. EXIT
                                    select  8
```

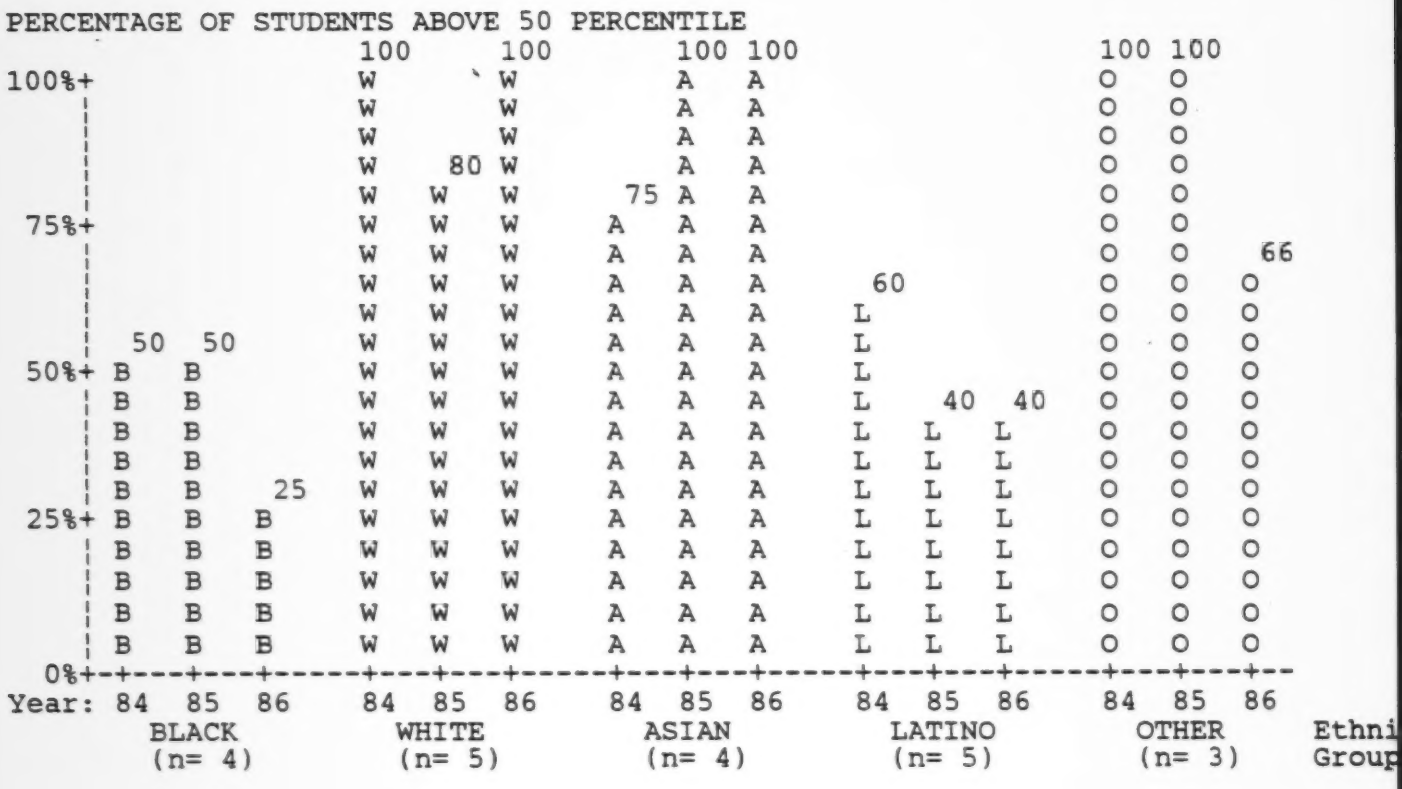


```
Command          ‖<C:>‖STUDS                ‖Rec: 14/81          ‖      ‖
```

School Level Report

Comparison of Achievement in Different Groups

Grade: 4
Year: 84-86
Total Math Score by Ethnicity



```
                    CHOOSE TYPE OF COMPARISON

                          1. AMONG ETHNIC GROUPS
                          2. AMONG SPECIAL PROGRAMS
                          3. BETWEEN SEXES

                          0. EXIT
0
                                  select  2
```

```
Command          ||<C:>||STUDS                ||Rec: 14/81          ||      ||
```

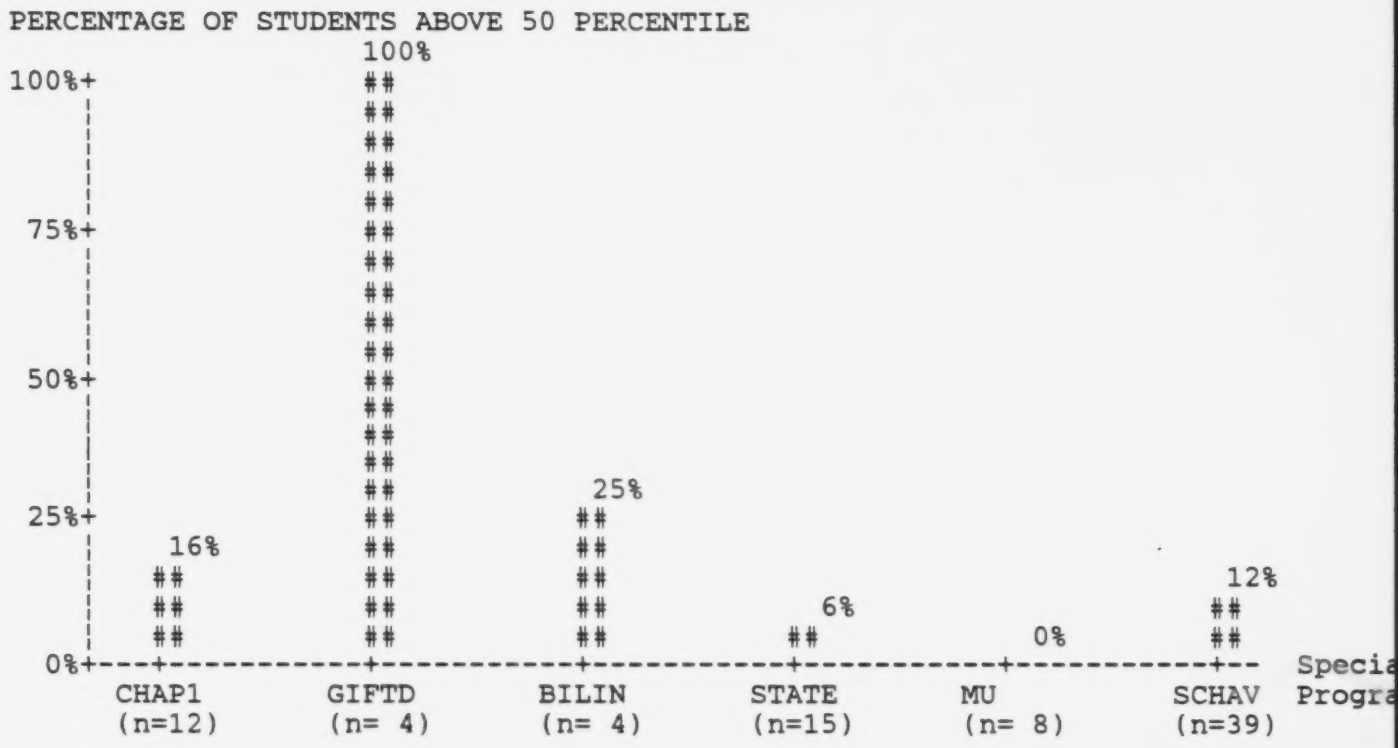
```
                    CHOOSE FIELD TO COMPARE

Hard Copy? Y
                                  1. Reading 1
Grade? 6                          2. Reading 2
                                  3. Reading 3
Year? 86                          4. Reading Total
                                  5. Math 1
Percentile 50                     6. Math 2
                                  7. Math 3
                                  8. Math Total

                                  0. EXIT
                                  select  7
```

```
Command          ||<C:>||STUDS                ||Rec: 14/81          ||      ||
```

School Level Report

Comparison of Achievement in Different Programs

Grade: 6
Year: 86
Math Score 3 by Program



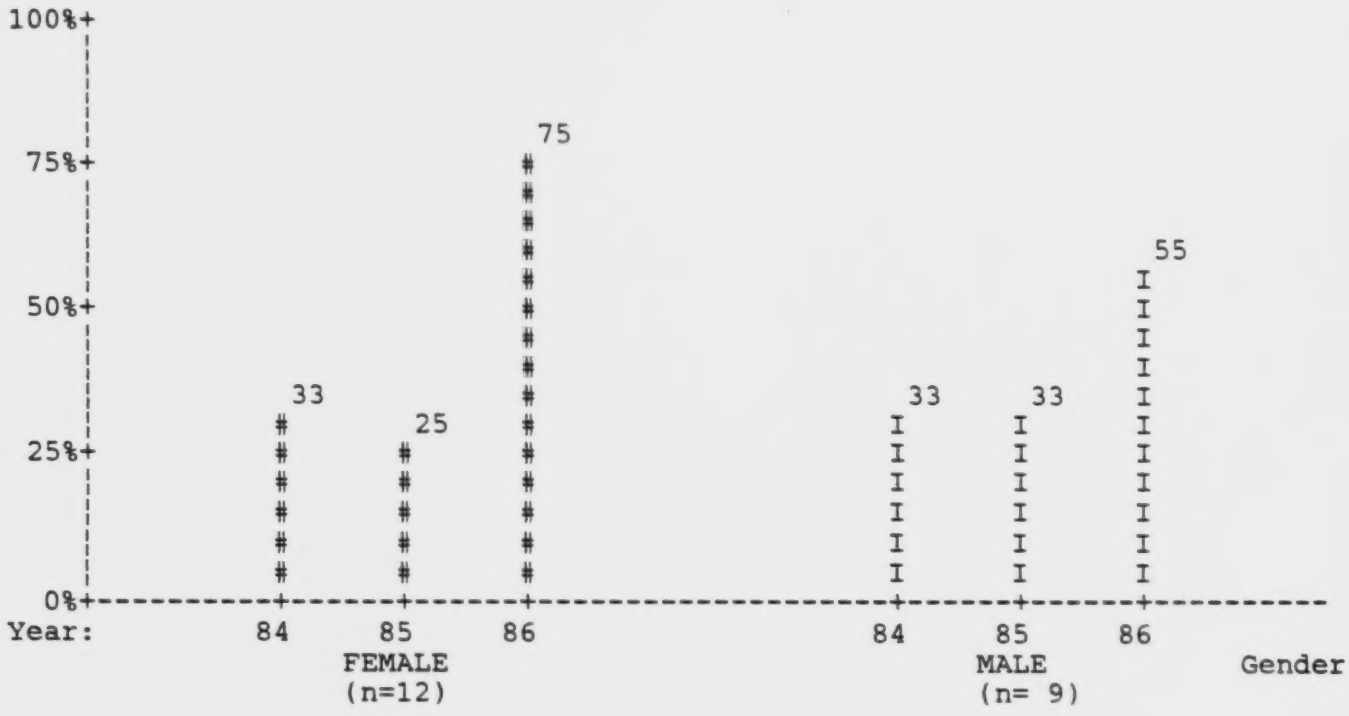
```
                    C H O O S E   T Y P E   O F   C O M P A R I S O N

                                  1. AMONG ETHNIC GROUPS
                                  2. AMONG SPECIAL PROGRAMS
                                  3. BETWEEN SEXES

                                  0. EXIT
0
                                  select  3

Command          ||<C:>||STUDS                ||Rec: 14/81          ||      ||
```

```
                    C H O O S E   F I E L D   T O   C O M P A R E

Hard Copy?  Y
                                  1. Reading 1
Grade?      4                     2. Reading 2
                                  3. Reading 3
From Year?  84                    4. Reading Total
                                  5. Math 1
To   Year?  86                    6. Math 2
                                  7. Math 3
Percentile? 50                    8. Math Total

                                  0. EXIT
                                  select  5

Command          ||<C:>||STUDS                ||Rec: 14/81          ||      ||
```

School Level Report

Comparison of Achievement in Different Groups

Grade: 4
Year: 84-86
Math Score 1 by Gender



APPENDIX

FIGURE 2

DISTRICT PROFILE

STUDENT OUTCOMES & PERCEPTIONS

Percent of Students Responding Positively or Above National Average

	Achievement		Attitudes			School	Teacher Expectations		Parent
	Reading*	Math*	SAM**	Reading	Math	Climate	Achievement	Discipline	Support
Cynwd									
5th	61.2	87.1	25.0	71.4	45.7	100.0	77.1	65.7	85.7
Cladwyne									
4th	70.0	80.0	30.4	58.3	79.2	95.8	66.7	79.2	87.5
5th	68.2	81.8	41.7	66.7	45.8	95.8	79.1	70.8	91.7
District									
4th	70.0	80.0	30.4	58.3	79.2	95.8	66.7	79.2	87.5
5th	64.1	84.9	30.6	69.6	45.7	98.4	77.9	67.6	88.0

*% scoring at least .5 years above grade level on standardized tests.

**% scoring significantly above national average on Student Attitude Measure.

For all other measures except school climate, responding positively was defined as scores at or above 3 on a 4 point scale where 4 = very positive. For school climate, scores at or above 2.5 were defined as responding positively.

Figure 3

5TH GRADE SCHOOL OUTCOMES AND PERCEPTIONS*
BY SEX, ETHNICITY AND LOCAL PROGRAM PARTICIPATION

	Achievement Scores		Attitudes		Parent	Teacher Expectations		School
	Reading	Math	Reading	Math	Support	Achievement	Discipline	Climate
Sex								
Male	45.5	38.5	3.3	3.3	3.6	3.7	3.3	2.6
Female	43.2	34.6	3.2	2.9	3.6	3.2	3.7	2.7
Race								
White	43.6	36.3	3.3	3.0	3.5	3.4	3.6	2.7
Other	49.7	35.7	3.3	3.1	3.9	3.7	3.0	2.6
Program								
Challenge	56.8	41.2	3.4	3.3	3.0	3.8		2.3
Resource Room	30.0	32.7	3.0	3.1	3.9	3.3		2.9
No Program	45.3	36.1	3.3	2.9	3.5	3.4		2.7

*Based on mean raw scores; for all measures except achievement, scores represent an averaged score on a 4 point scale where 4 = very positive. For achievement, total possible in Reading = 60; in Math = 50.

Figure 4

SCHOOL

Percent Responding Positively To Aspects of School Climate

	Student Perceptions of			
	Physical Plant	Students	Principal	Teachers
4th Grade	75.0	75.0	95.8	95.8
5th Grade	66.7	70.8	100.0	100.0

Figure 5

_____School

5th Reading Achievement

by Subgroup

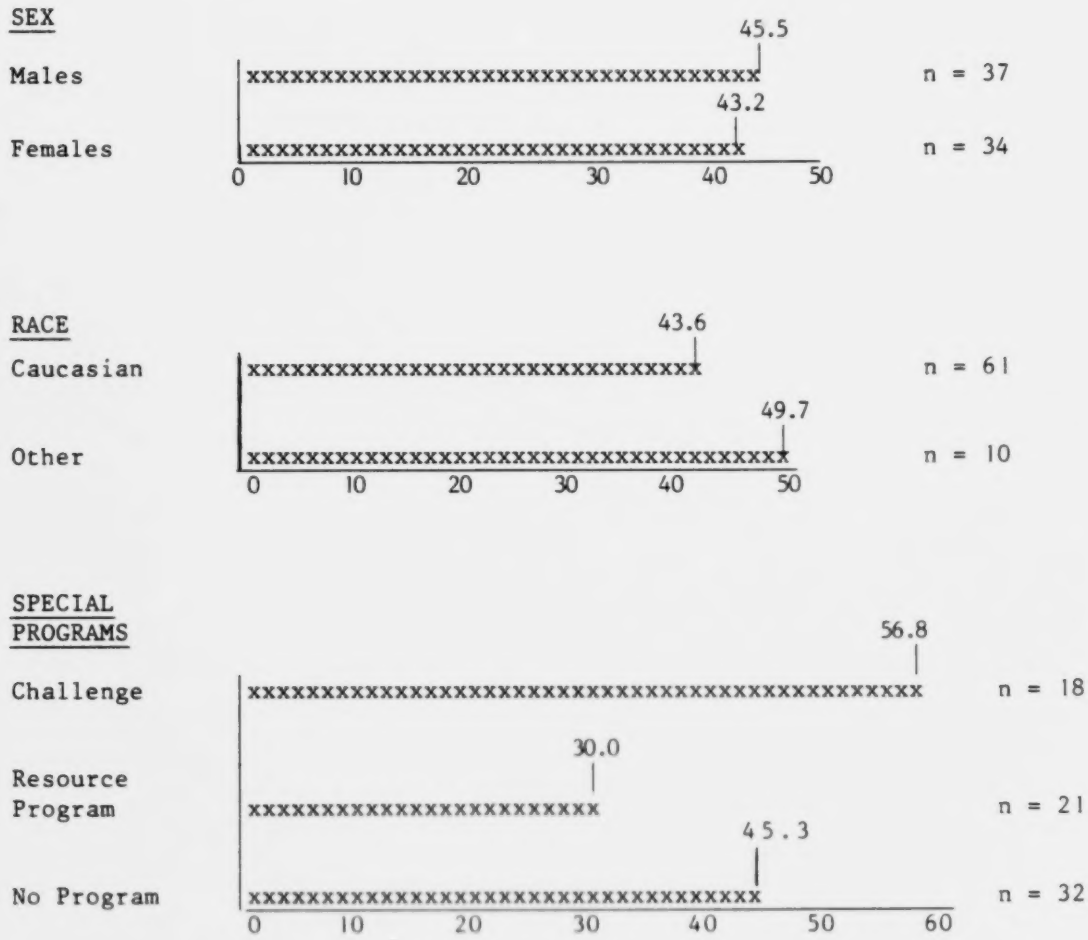


Figure 6

CLASSROOM ROSTER

School: School
Teacher: (184-34)
Grade: 4th

Student Characteristics

Total Number of Students: 24

% Male 39.3
% Female 60.7

Local Program	#	%
Challenge	1	3.6
Resource Room	2	7.1
Speech	1	3.6
Title I	1	7.1
Total	6	24.1

Student Achievement:

	% Above Grade Level	% Below Grade Level
Reading Total	68.2	31.8
Math Total	81.8	18.2

Student Attitudes (percent responding positively):

Toward reading: 83.3
Toward math: 58.3
Toward self in school: 30.4

Perceptions:

Teacher expectations for achievement: 79.2
Teacher expectations for discipline: 66.7
Parent support for school: 87.5
Perceptions of school: 95.8

Figure 7

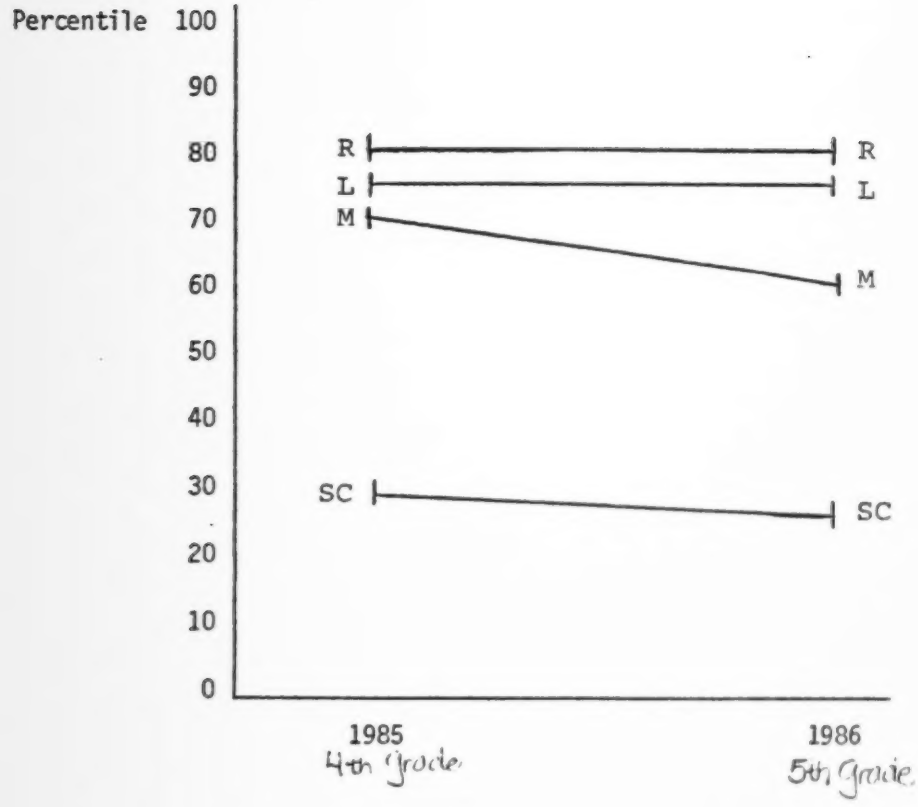
STUDENTS AT A GLANCE
Teacher: Brown 08/18/87

Student Number	Student Name	GRADE	SPR G	ABS	READ %	RDVAL	MATH %	MTVAL	AMTHW	PRHLP	PRSUP
7883432	Alexander, Terr	2	.	3	77	3.4	39	3.3	4.0	3.2	4.0
4321339	Andrews, Sarah	2	T	7	99	*	59	*	*	*	*
7783216	Chambers, Sharo	2	.	11	70	3.3	34	3.0	1.2	0.0	0.0
9849030	Connors, Daniel	2	.	7	62	1.1	49	2.2	2.3	3.0	4.4
7890322	Donaldson, Mark	2	.	7	*	2.5	*	3.2	3.4	4.3	2.4
3324870	Edwards, James	2	T	20	56	2.3	54	4.0	3.0	1.4	1.5
4335314	Johnson, Debbie	2	I	8	29	2.2	55	2.4	3.4	2.0	3.0
5678390	Jones, Mary	2	G	10	66	1.0	36	3.0	1.2	1.3	2.0
7890232	Marshall, Diann	2	.	10	57	2.3	50	3.0	1.2	1.0	1.0
7787568	Monroe, Thomas	2	.	9	63	4.0	37	3.4	2.3	1.0	1.0
4439382	Nadar, Benjamin	2	G	11	57	3.3	34	2.2	3.0	1.4	1.2
7783219	Owens, Ronald	2	G	12	67	2.0	41	3.0	3.0	2.4	2.3
3321332	Parker, Karen	2	GT	10	52	3.3	71	4.0	1.0	1.1	1.0
7777432	Peters, Mike	2	G	11	57	2.2	36	1.0	2.2	1.4	2.3
4343210	Pike, Charles	2	I	8	23	2.1	35	2.0	2.3	2.0	3.0
6753210	Rogers, Grace	2	.	10	57	1.1	47	2.3	2.0	1.3	4.0
7798321	Shaw, Tom	2	.	5	37	2.2	51	1.3	3.3	1.2	3.1
8498399	Sherwood, Steve	2	G	8	78	*	44	*	*	*	*
5226780	Tyler, John	2	.	5	70	1.4	38	3.1	2.2	1.2	1.3
7865308	Washington, Dav	2	G	13	49	3.0	33	3.4	3.0	2.3	3.0

Figure 8

DISTRICT AT A GLANCE

Fourth Grade



R = Percentile Score on Standardized Reading Test

M = Percentile Score on Standardized Math Test

L = Percentile Score on Standardized Language Test

SC = Percentile Score on Academic Self Concept

Figure 9

SCHOOL AT A GLANCE

Academic Self Concept

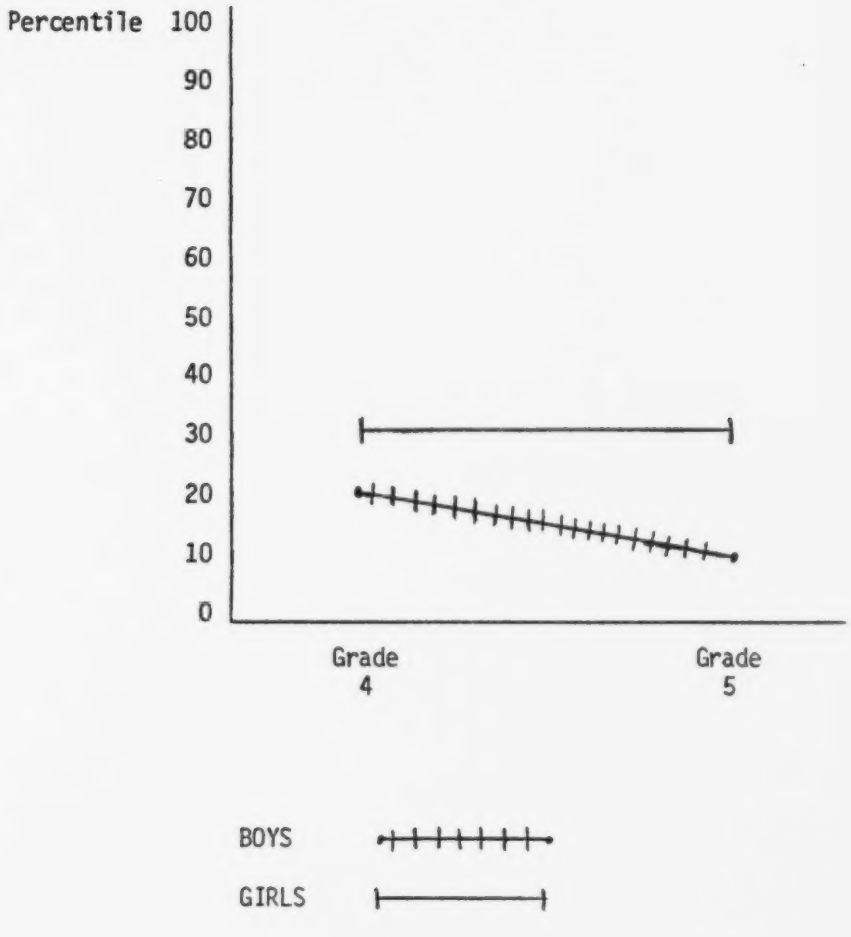


Figure 10

SCHOOL AT A GLANCE

Perceptions of School Climate

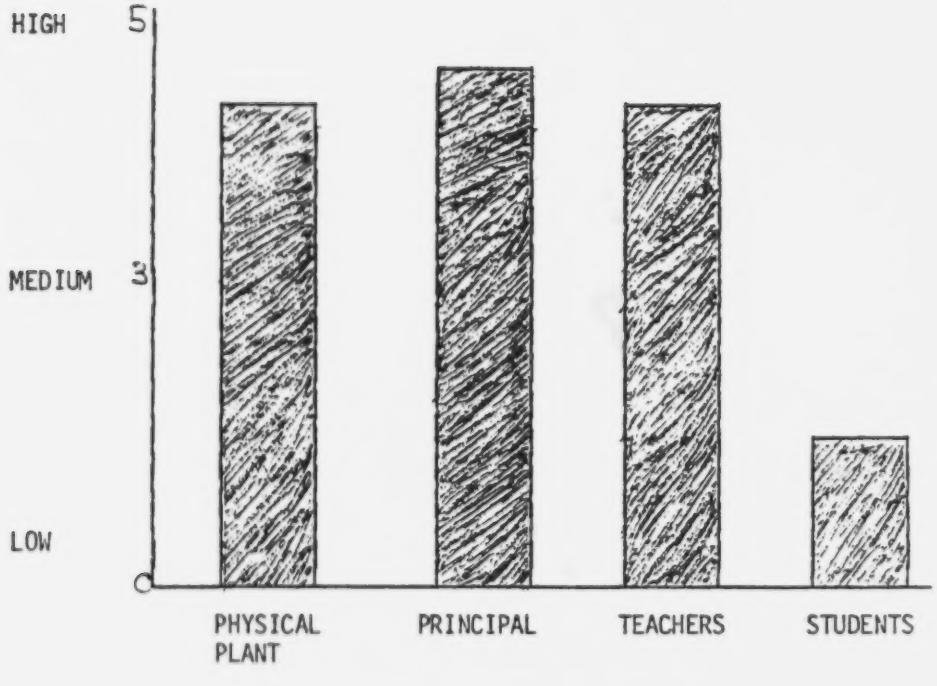
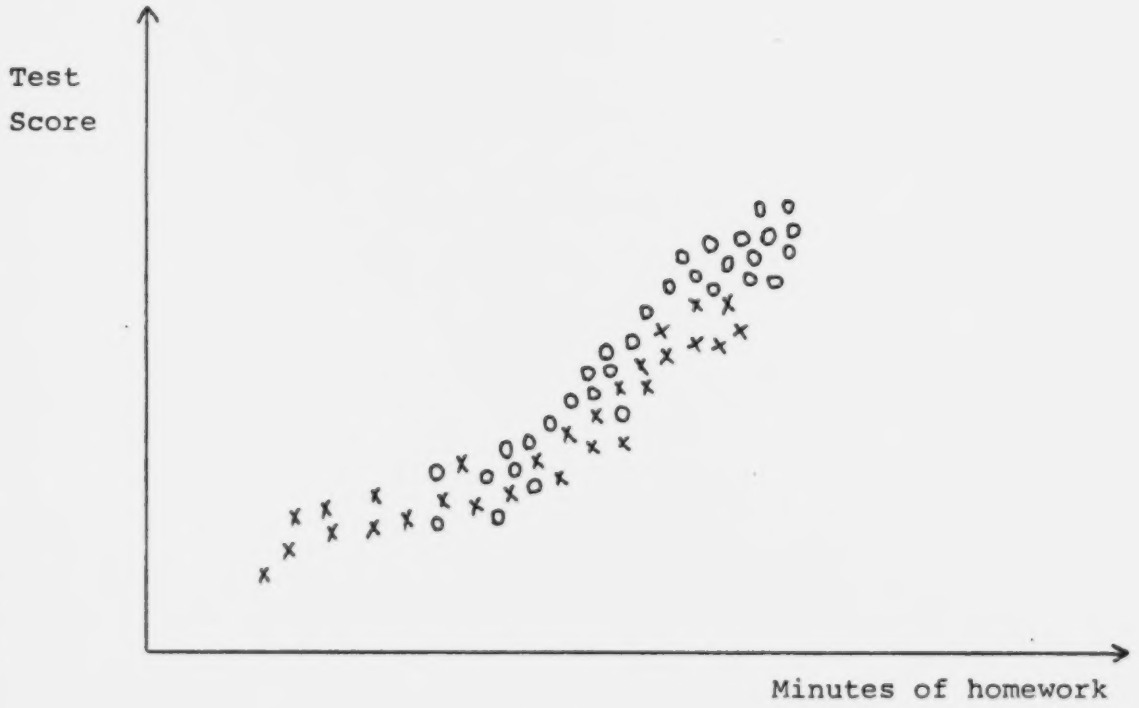


Figure 11



Plot of minutes of homework versus test scores. X's represent one school, O's represent a second school. Some students in school X seem to do much less homework than those in school O. School O students seem to obtain higher scores, even when homework time is similar.

Hypothetical exploratory study graphic.. 122